Determinants in the adult recall of autobiographical childhood memories

Thesis

DETERMINANTS IN THE ADULT RECALL OF AUTOBIOGRAPHICAL CHILDHOOD MEMORIES

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ABSTRACT

This thesis investigated the characteristics of childhood memories that remain accessible over the whole life span. On the assumption that one of the primary purposes of autobiographical memory is its adaptive function, it was hypothesised that, in order to fulfil this function, autobiographical memories must include an affective component. That is, each memory will consist of a record of an experienced event together with the accompanying emotion so as to mediate an appropriate behavioural response in similar future circumstances. For the same reason, it was also predicted that, as a person grows older, selected childhood memories will still retain their emotionality, vividness and personal importance. A detailed analysis of the nature of childhood memories was undertaken and evidence to support these hypotheses was sought in three separate studies.

In Study 1, a structured interview was used and 109 people aged between 21 and 91 years were asked to free recall memories drawn from within three - year periods of childhood from birth to 18 years. Subjects' ratings were used to explore the characteristics of these memories and the effects of age encoding, subject age and subject gender were systematically examined. In contrast with previous research, it was found that 83 % of subjects could recall memories from below three years of age. Uniformly high ratings of emotionality showed that the affective component, as predicted, was high across all encoding ages and showed no decline with subject age. Ratings of clarity and realism were also unaffected by subject age. The incidence and vividness of sensory imagery increased with age of encoding but, again, did not decline with subject age. Although most vivid memories involved imagery, 15% of subjects sometimes claimed to recall vividly without imaging.

These findings suggest that the affective component may have been contributing to overall vividness.

Study 2 using cued recall, compared latency of response for emotion cued words and object cued words and also used ratings to examine the characteristics of the retrieved memories. Memories were retrieved faster to object cues but these memories were still rated high in emotionality. Memories retrieved to emotion cues, although slower to access, were rated as more important, more emotional, more unusual and more frequently recalled. Cue type was therefore shown to be a powerful factor in determining accessibility, overriding other memory characteristics.

Although in Studies 1 and 2 subjects selected their own memories, Study 3 tested the retention of details of early experience of school life as designated by the researcher. It was found that detailed memories could still be recalled even in old age and that the rate of forgetting declined steadily with age This evidence of persisting retention of early childhood experience is consistent with the view that such memories serve a functional role in that they are an integral part of the individual's self history and developing self concept.

The research provides a substantial body of data detailing the topics recalled from different periods of childhood and the nature of the memories and charts the remarkable stability of these memories across the life span.

CHAPTER 1

SOME THEORETICAL ISSUES

ABOUT

AUTOBIOGRAPHICAL MEMORIES

1.1 Introduction

The research presented in this thesis aims to identify determinants that facilitate the recall of childhood memories in adult life. Relevant literature offers many explanations why childhood experiences are often forgotten (see chapter 2.6 for a review of Childhood Amnesia). However, little or no research has focused on why certain events, even from very early childhood, are sometimes remembered with astonishing vividness over a lifetime. This thesis examines a large sample of childhood memories and analyses their content and nature in order to infer what properties enable early memories to survive, apparently intact, over a life-span that may stretch into extreme old age.

The approach adopted in this thesis rests on two basic assumptions. The first is that autobiographical memory has adaptive value. This assumption is supported by consideration of the functions of autobiographical memory in section 1.4.2 and is integral to Johnson's MEM model described in section 1.2.6.

How, one might ask, can one test the validity of an assumption of adaptive value if the truth can only become evident in later generations. Fortunately, we need not look to the uncertain future, but can draw inferences from the established past. Darwinian theory requires that any adaptive attribute of a living species must have been present in its earlier prototypes. Memory of experienced events can be seen to ante-date even the evolution of brains. Insects such as ants and bees have no brains, only ganglia linked to motor systems, yet they are adept at remembering where they found food and at finding their way 'home'. So, in accord with the inductive approach of Charles Darwin (1858) shared, inter alia, by Bruce (1985), Dawkins (1983, 1989) and the present writer, this research accepts that the most

important function of autobiographical memory is its adaptive value. Otherwise it could not be with us in its present highly developed form after millions of years of phylogenetic mutation and evolution. It should be noted that this argument, while in accord with both of Mendel's laws of heredity, does not involve acceptance of the fallacy propounded by Lamarck (1809) and more recently by the Russian Lysenko (1949), namely that acquired characteristics can be transferred to future generations.

The adaptive function of the autobiographical memory is due solely to the fact that learning from personal experience, i.e. remembering what proves harmful and what is beneficial is likely to prolong the lives of individuals who possess this attribute. They will thus have greater opportunity to pass on their ability genetically to future generations, until the adaptive advantage becomes shared by virtually the whole species. Belief in the adaptive function of autobiographical memory is basic to the perspective adopted here.

The second assumption is that autobiographical memory always contains an affect component. This can be regarded as a prediction arising from the assumption of adaptive value. For unless the experiencer remembers not only the content of 'what happened', but also the affect of the memory, that is what is felt about it, recall of the memory could provide no adaptive guidance as to whether to encourage or avoid such an event in the future. Consequently, it is hypothesised that when an event is recalled, the two components 'fact and 'affect' will be clearly apparent in childhood memories, and that affect will be a particularly important determinant of childhood memories.

Apart from these broad hypotheses, the approach used in this research is essentially exploratory, as befits the precept of David Rubin (1986 p5) who wrote:

"One of the most encouraging indications that real progress is being made in autobiographical memory is the willingness of psychologists to delay committing themselves to particular theories and detailed hypotheses until phenomena worth their theorising have been more fully described."

The research reported here includes a detailed analysis of childhood memories. The characteristics that emerge throw light on the determinants by showing what properties are associated with life long retention of childhood memories. The analysis addressed the following questions:

i) How young does autobiographical memory start?

ii) What sort of events are remembered?

iii) How vivid are childhood memories?

iv) Which senses are involved?

v) How did people feel at the event and at recall?

vi) What triggers childhood memories?

vii) What is the personal meaning of what is recalled?

However, the exploratory approach used in these studies to identify the determinants of childhood memory is guided by the rich and growing body of knowledge about adult autobiographical memory, the salient features of which are outlined in sections 1.2 - 1.7

1.2 Different Kinds Of Memory

It is useful to review the different kinds of memories ordinarily used in daily life, in order to position autobiographical memory within the general framework. Or, more accurately, to position differentiated types of memory within the broad framework of autobiographical memory, since remembering experiences from one's past will encompass instances, singly or in combination, of every type of memory system.

The question of how many functionally different kinds of memory are in ordinary use has been addressed since the last century by such researchers as Ribot (1884), Galton (1883), James (1890), Freud (1915) and many others. However, rather than trace consensus and differences over past years, let us turn at once to two influential contemporary views, those of Tulving (1985) and Johnson (1983, 1986).

Tulving proposes five criteria by which to distinguish separate memory systems.

1. Different memory systems have different functions and handle different types of information.
2. Different systems may employ different processes but need not necessarily do so.
3. Different systems operate in different brain structures or mechanisms.
4. Different systems have developed at different evolutionary stages.
5. Different systems may have different forms of representation.

Using these criteria Tulving lists five separate but interacting kinds of memory which he names, defines and describes as follows:

(Each of these systems includes multiple sub-systems which he does not identify)

1. Procedural Memory

"Learned connection between stimuli and responses." (Tulving 1985 p.387) In other words, to borrow a Piagetian term, the 'internalising' of motor skills to the point where their performance demands little or no conscious thought.

Steven Rose (1992) suggests this was the earliest form of memory to evolve among living creatures. Adaptively, this is inferred from the fact that learning the motor skills needed to cope with the environment is a sine qua non of survival. This adaptive need is reflected in the fact that the earliest memory to develop in a human infant is motor control (see section 2.2.1). In the adult recall of childhood memories, procedural memory will inevitably be playing a part, for even the simplest bodily activity once had to be learnt. However, the role of procedural memory in autobiographical recall will almost certainly be unconscious. For, as Tulving puts it "The greater the skill the more automatic is its doing." We may remember riding a bicycle but not consciously recall the motor activities involved.

Procedural memory is very retentive and is relatively resistant to ageing and trauma. (Parkin, 1987). Once learnt, a motor skill may stay unused for years without being forgotten. This, too, conforms to adaptive necessity, for in an emergency it might well be too late to start, relearning a forgotten skill.

2. The Perceptual Representative System

This is the process for the recognition of objects and actions. It relates current sensory input to previous experience. The adaptive value of this function needs no elaboration. Nor does the fact that without recognition of the features and nature of an event it could not take its place in autobiographical memory. Thus, the

perceptual representative system is an essential participant in the encoding of childhood memories, but as with procedural memory, it is usually taken for granted and its role passes unnoticed.

3. *Short Term Memory*

Today this is often defined as 'working memory', for it is here that conscious mental processing is carried out.

Working memory is characterised by a short retention span, just long enough to transfer appropriate information to long-term memory, or if inappropriate, quickly to forget and 'clear the slate' to make room for the next input. An example is sub-totals when adding a column of figures. Adaptively, the ability to forget what is no longer meaningful is crucial, for faced with sudden danger, it could be fatal if the mind were still occupied by previous information. In terms of autobiographical memory, working memory is the interface between input and long-term memory store. It is the instrument of encoding.

These functional attributes relate to an assumption of sequential stages of processing like that of the Atkinson-Shiffrin model (1971) (see fig. 1.2.1).

4. *Semantic Memory*

This is Tulving's name for propositional knowledge of the world that is independent of the rememberer and of temporal and spatial context. For example, the battle of Hastings was fought in 1066, canaries have wings, Walton Hall is located in Milton Keynes. General knowledge of this kind can be aquired from instruction or by generalisation from repeated experiences.

An important attribute of semantic memory is its ability to provide information and understanding about phenomena beyond the relatively limited data bank of personal experience. Its essential contribution to autobiographical memory is that it facilitates recognition and understanding of the nature and probable consequence of phenomena when observed and interpretation of current experiences.

5. Episodic Memory

This has been defined as the conscious recollection of personally experienced events. Adaptively, this process is vital, since it alone enables learning from experience. Episodic memory is the broad category which includes autobiographical memory. Tulving (1983) made no distinction between the two, though in his 1985 paper he does so, anticipating some of the distinguishing refinements made by other researchers since (e.g. Conway 1990, Nelson 1991, Baddeley 1991).

6. Multiple Entry Modular Memory (MEM)

In MEM, Johnson (1985) presents a radically different approach from that of Tulving. Her MEM proposes a single, all-embracing system with three major sub-systems that serve, by selective interaction, to provide meaningful recall of the extremely wide diversity of life experiences. The three major sub-systems within MEM are;

1. The sensory record; exogenous sensory input.
2. The perceptual record; the combination of sensory elements and stored knowledge that enables identification and gives meaning to what is perceived.
3. The reflection record, i.e. the product of internally created stimuli; thoughts that evaluate semantic and emotional

associations with information already stored in long-term memory.

The experience of remembering is drawn from the particular blend of information from each of these sub-systems that reaches awareness. Access to a single memory is possible through any one, or combination, of sub-systems. MEM denies the sequential stages of processing from an initial sensory buffer store through working memory to LTM, as in Atkinson-Schiffrin model. According to MEM all entries are simultaneous and permanent, including those classed in other models as transient if not transferred quickly enough from buffer store or short-term memory.

MEM differentiates between personal, i.e. autobiographical memory and other episodic recall. Whereas less personal episodic memories are created by all the sub-systems, personal memories are far more likely to include major contributions from the reflection system.

The evaluative function of the reflection system provides guidance for the future and so lends particular adaptive value to autobiographical memory. To emphasise the role of personal interpretation, Johnson writes: "We do not remember what we saw but what we thought." This view is particularly relevant to the adult recall of childhood memories, since the passage of time and many mental rehearsals will ensure that the perceptual information about the event will have become thoroughly suffused with evaluative thoughts and feelings about what happened. MEM, in common with other constructivist models, holds that there is not a single engram for an experienced event, but a multiplicity of entries, including those that are subjectively generated from within the reflection sub-system. According to

MEM, within an appropriately cued personal memory, information is activated from all the sub-systems, but information from the dominant reflection system is likely, at least partially, to inhibit information from the perceptual system. Evidence that such inhibition need only be partial is provided within the present research by the finding that, as predicted by Brewer (1986) most autobiographical memories are imaged visually. Conversely, cases of total inhibition may explain why as many as 15% of the subjects in the present study claim sometimes to experience vivid recall with little or no visual or other imaging.

Conceptual differences between types of memory systems are to some extent confirmed by neuropsychological evidence (Parkin, 1997), but this lies outside the scope of the present thesis.

When first published (1983, 1985) Tulving's and Johnson's proposals may have seemed irreconcilable. But by 1991, Tulving appeared to share at least some of Johnson's constructivist views when he wrote (p.25) that he now believed there is no single engram for a recalled event, but rather that memory consists of "a number of different brain / behaviour / cognition systems and processes that through co-operation and interaction with one another, make it possible for their possessor to benefit from past experience and thereby promote survival."

Table 1.2.1 and fig 1.2.2 summarise the Tulving and Johnson models. These models provide a theoretical framework within which the present studies of childhood memories can be readily accommodated.

Fig 1.2.1 The Sequential Atkinson-Shiffrin Model

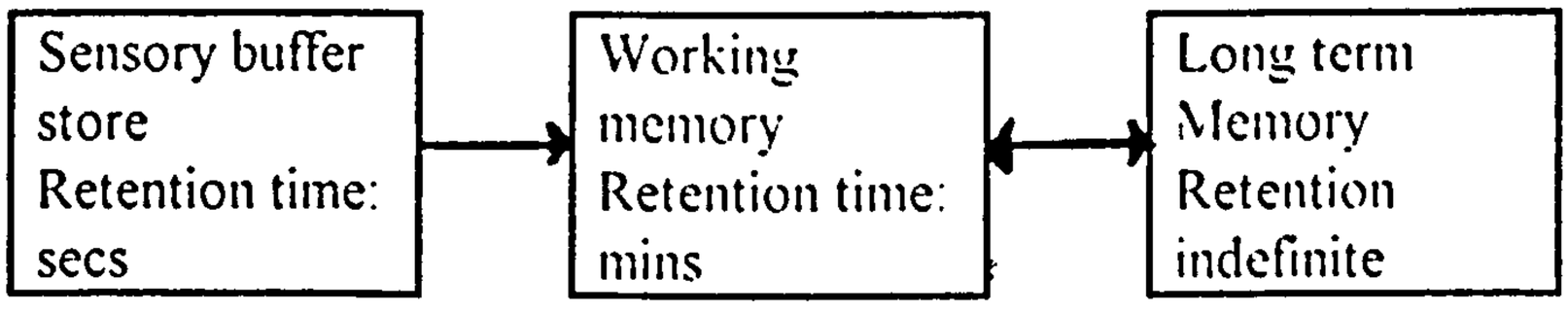
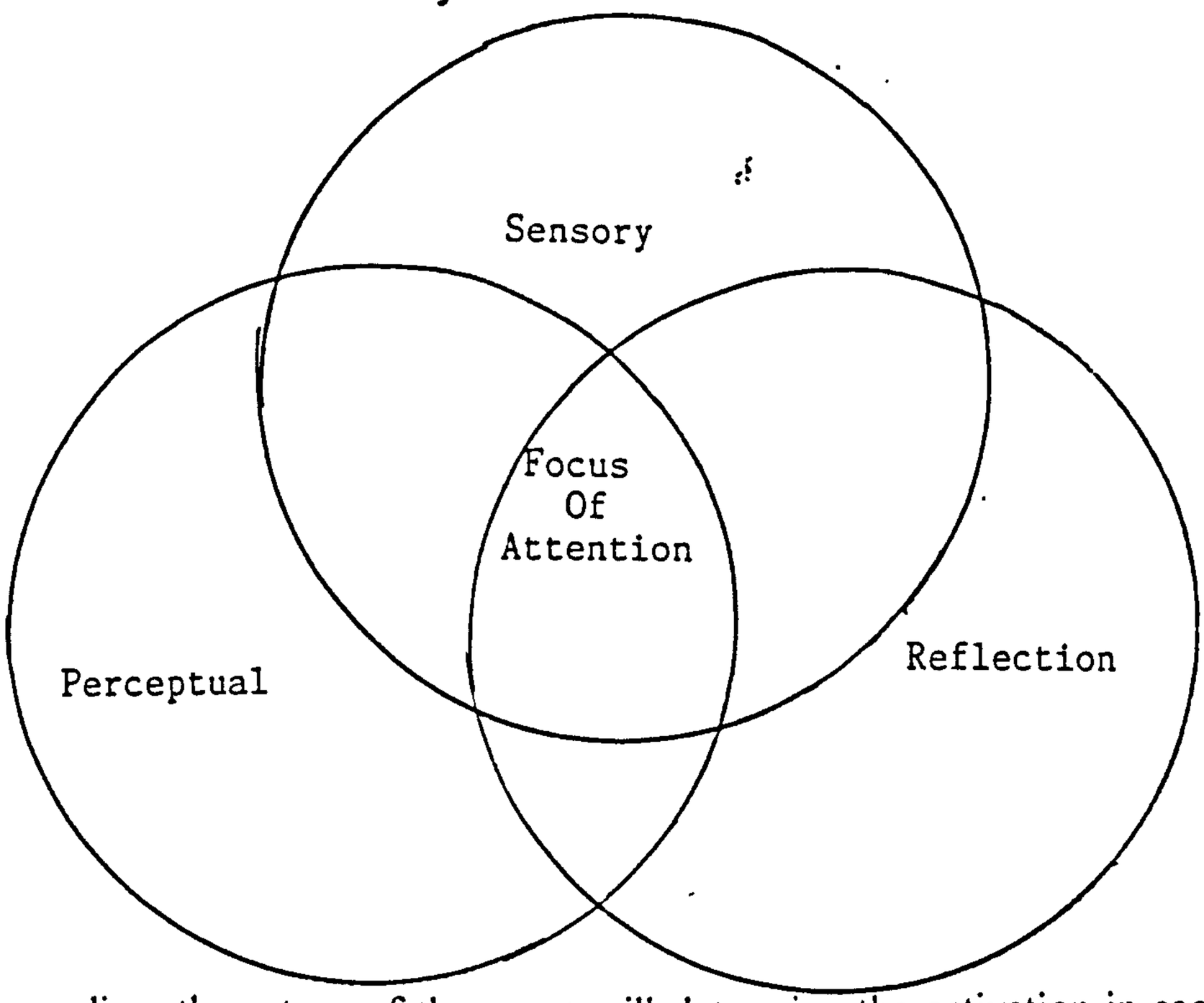


Table 1.2.1 The Tulving Model - Long-term Memory

Memory System	Functional Domain
Procedural	Bodily actions and acquired motor skills
Perceptual Representation	Sensory input and its interpretation according to previous experience
Short term memory	Mental processing of input for transfer to LTM if appropriate
Semantic	Knowledge of the world independent of specific personal experience
Episodic	Recall of personally experienced past events
Autobiographical Memory	
	A self-centred sub-section of the episodic system

Fig 1.2.2 Johnson's Model - M.E.M.

Inter-Active Sub-Systems



At encoding, the nature of the event will determine the activation in each of the sub-systems. At recall, the nature and strength of activation within each of the sub-systems will determine the memory at the focus of attention.

1.3 What Is Autobiographical Memory?

At its most basic level, autobiographical memory could be defined as a sub-section of Episodic memory that recalls episodes or events from the remember's past. However, within this widely accepted generalisation, there are many distinctions that different researchers have selectively emphasised. For example, Baddeley (1991) affirms that, for him, the episodic element is not an essential ingredient. His critical criterion is that "the memory must directly involve the rememberer in its content." Consequently, he writes (p.20) "I would also regard such well known facts about oneself as one's name and the names of teachers who taught you at school as being examples of autobiographical memory..... Viewed in this way, autobiographical memory is not a special system, but rather refers to the use of general memory processes to store and retrieve information about the rememberer."

Other researchers, while not denying that autobiographical memories use general memory processes, find it meaningful to particularise the term autobiographical to the recall of active or passive participation of the self in an event. For instance, Conway (1990) distinguishes between 'knowledge of autobiographical fact', e.g. the address of the house where you live, as distinct from 'autobiographical memory', like remembering how you first moved into that house.

Sometimes the distinction may owe more to personal meaning related to context than to the extent of participation in an event. For instance, "I left the keys on the hall table," may be no more than knowledge of biographical fact within a context of "where are the keys?" Yet in a scenario where someone is irrevocably severing a relationship and 'walking out for ever' on their partner this episode might be a

powerful autobiographical memory - putting the final fullstop to the end of a life chapter. The strength of the distinction here aims to emphasise a factor that is increasingly being regarded by researchers as a crucially important determinant of autobiographical memory, namely the degree of self involvement or personal meaning of an event for the rememberer.

David Rubin, in his *Introduction to Autobiographical Memory* (1986 p.7) writes: "Autobiographical memory is about the self, the source of information about our lives from which we are likely to make judgements about our own and to some extent others' behaviour." Few today would disagree. Cohen (1996 p.156) defines autobiographical memory as "How we remember the events and experiences that form our personal history." Nelson (1991) endorses the concept of self involvement and links it inseparably to affect. She writes "All experience that involves awareness of oneself will have two aspects of remembering, the recall of 'what happened' and 'what I felt about it'." Nelson's words suggest that, since all autobiographical memory is experienced by a self, it is bound to have affect content, without which it should be relegated to such episodic categories as historical knowledge of autobiographical facts, as suggested by Conway.

Nelson's view is shared by the present writer. Hence, despite common practice in the past, the term autobiographical and episodic, as used in this thesis, are not interchangeable and the thesis is concerned with autobiographical memories not with autobiographical facts. As hypothesised in the Introduction (1.1) autobiographical memory could not serve its adaptive purpose if affect did not prompt us to discriminate which experiences are to be sought and which avoided. Consequently, it is predicted that, as proposed by Nelson, an affective component will be found in the free recall of autobiographical memories. This hypothesis is

consistent with views expressed by Bartlett (1932). He affirmed that it is primarily the recognition of the subjective feelings attached to a particular memory that enable the recall and imaging of its objective elements. Of course, affect can also be, and often is, evoked by items of semantic or general knowledge of the world, but these are not specific to a particular personal experience. If they were they would be autobiographical.

1.4 Properties Of Autobiographical Memories

1.4.1 The Role Of Self

The self concept is central to autobiographical memory. For, as Johnson (1985) has pointed out we remember not what we saw but what we thought; what our particular self understood and felt about the experience. Conversely, it is, at least in part, the recall of life experience that makes us what we are.

Fitzgerald (1991 p.99) proposed that the self concept owes much to the self narrative of past personal experiences. Self narrative, he writes, is a process of life review, often encountered in successful ageing. Like Neisser (1989), Fitzgerald points out that to understand the role of self concept, it is important to take into account its multifaceted nature. These different aspects of the self have been described by both Brewer and Neisser.

Brewer (1986 p.26) describes the self as composed of an experiencing ego, a self-schema and an associated set of personal memories and autobiographical facts. Neisser (1989) identifies and describes five aspects of self that can play a part in autobiographical memory:

1. Ecological self: the centre of physical perspective
2. Impersonal self: the species-specific, interpersonal communicator
3. Private self: our own feelings and beliefs. Our ultimately private emotions which are possibly beyond verbal descriptions. The private self involves awareness that these feelings are uniquely ours.
4. Conceptual self: sensitive to culture-specific beliefs - to possible differences between "What I feel" and "What I ought to feel." Tension

caused by such divergence may be resolved by distorting memory to conform to an acceptable norm.

5. Whole self: the holistic view of an event experienced by an individual by an amalgam of the above four aspects.

These different aspects of the self will be differentially active according to the individual's make-up and to their perceived relevance to the external event. The almagam will, thus, be central to the autobiographical memory, particularly to its affective component. The involvement of Neisser's different aspects of the self is discernible in the detailed analysis of childhood memories carried out in the studies described in chapters 4, 5 and 6.

1.4.2 Functions Of Autobiographical Memory

An understanding of the functions of autobiographical memory will necessarily throw light on what determines the retention of childhood memories. In an attempt to find out how a sample of subjects actually did use their recollections of past events, Hyman & Faires (1991) conducted two studies. The first used free recall of memories that often came to mind and categorised the uses to which they were put. The second study repeated the categorisation, but from memories evoked by cue words.

Ten categories were produced. The five most common, in rank order, were labelled:

1. "My experience with x" - narrative about a personal experience concerning some topic.
2. "Point illustration" - making a point in discussion or giving advice.

3. "Self description" - used when talking about the subject's self rather than some external topic.
4. "What's up?" - expressing concern about some current event in one's life.
5. "Daydreaming" - associative reminiscence.

Less frequent functions were: problem discussions, entertainment, testifying and reminiscing.

It is interesting that the 'directive function', guiding behaviour as predicted by Schank (1986) did not emerge in either of the above two studies. Also, the relative rank orders of reminiscing and daydreaming would probably be much higher in an older subject sample (McCormack 1979, Coleman 1986).

Different researchers have accorded primacy to different functions. Yet there is a good deal of common ground. Schank (1986) has argued that most knowledge is stored as personal memories, and that these play a crucial role in guiding behaviour. At a fundamental level, this supports the view hypothesised earlier that learning from experience is essential to survival. But Schank here is probably referring to guiding social and problem solving behaviour in the shorter term of daily life.

Robinson and Swanson (1990) suggest four functions:

1. Interpretation of others' actions
2. Maintenance of relationships
3. Mood regulation
4. Self definition

Barclay and Smith (1991 p.78) write: "Autobiographical memories give us a sense of intellectual and emotional coherence and comfort and establish and maintain intimacies through joint reconstructions of the past. (The latter function is, of course, absent in silent recall). Lowenthal (1985 p.210) holds that "The prime function of memory.....is not to preserve the past but to adapt it so as to enrich and manipulate the present." A similar point is made by Barclay and Smith (1991, p.80) who say "Autobiographical memories serve an adaptive function, just like other memory. However, for a memory to be autobiographical it must acquire certain kinds of meanings, especially meanings associated with feelings of connectiveness, mutuality ... stated differently, memories become autobiographical in their use, coupled with associated affect that indexes them as personally relevant." The extent to which we are what we remember is forcibly made by Rose (1992) when he points out you can lose an arm or a leg or have a major transplant and still keep your identity, but lose your memory, and even to yourself, you are no longer YOU.

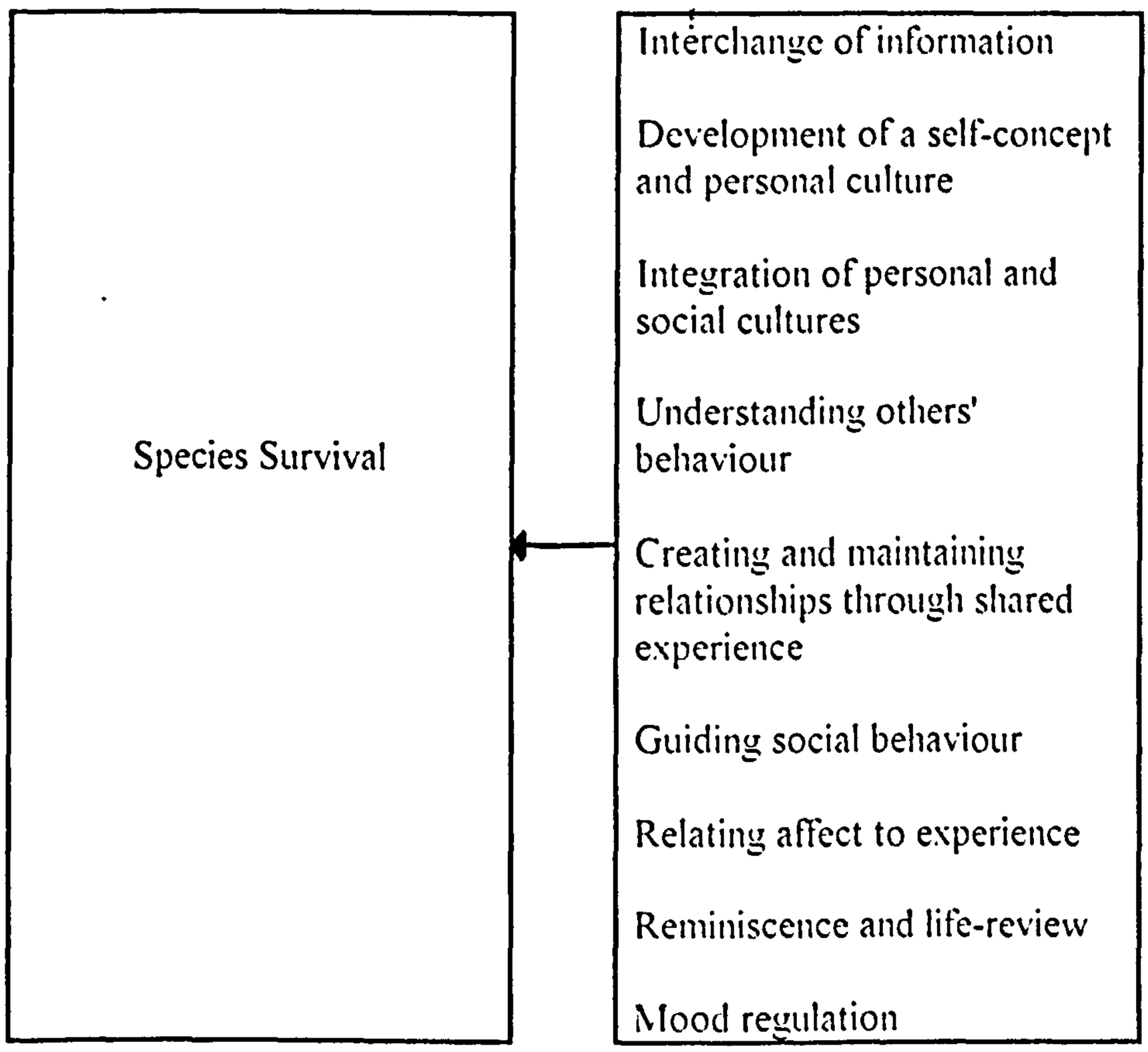
There is much consensus that autobiographical memories are more than the recall by an ego of self-referenced information; functionally they are an integral part of the self and result (Bartlett 1932) "from a process of cognitive justification of feelings within a reconstructed instead of a reproduced past." Bartlett (1932 p.206-207) reports that when a subject is asked to recall a witnessed event, the first thing recalled is usually the 'attitude' towards the experience, and only then are objective elements marshalled to justify the attitude. Recent evidence supporting Bartlett's finding is provided by Miller et al (1990) who examined personal story telling by children aged 2½ and 5. The children's co-narrations are defined as an episode of talk involving 2 or more utterances addressed to an interlocutor and describing a particular past event in which the child portrayed him / herself as a

protagonist. Analysis of the conversations, recorded in the childrens' own homes, showed consistent inclusion of self information and self appraisals associated with events. Miller et al concluded that co-narrated personal story-telling is a common means by which children, together with family members, experience and re-experience self relation to others Thus, co-narration serves the important function of enabling children as young as 2 or 2½ to start developing their self-concept and personal culture and to acquire narrative and conversational skills (Bruner 1987, Fivush and Reese 1991).

Barclay and Smith (1991 p.90) concluded that "autobiographical remembering is an adaptive process that helps sustain a sense of personal cohesion (mental health) and connectedness with others." They added that, jointly, these functions position the self within the wider social culture of one's community.

It would appear that there is much in the findings of many researchers that relate positively to the two main hypotheses of this thesis, namely that adaptive value and affective content determine the remembering of our past. Among the researchers quoted, there is frequent reference to adaptive function, and a general consensus that the self is central to what is autobiographically remembered. The self-concept is seen as inseparably linked to the personal meaning of what is experienced and recalled. Personal meaning is the holistic view of an event as uniquely experienced by what Neisser (1989), calls the "whole self." Personal meanings are basic in the recall of one's life-history, and in the moulding of one's own personality and behavioural responses that distinguish one's own personal culture. Personal meanings of events will always have affect content. (Nelson 1991, Bartlett 1932, Johnson 1985, Robinson 1980, Conway 1991, Neisser 1989).

Fig. 1.4.2.1 The Adaptive Functions Of Autobiographical Memory Within The General Memory System



Note: No rank order is implied in the listing of life-span functions.

1.4.3 Reconstruction Or Copies?

Although an autobiographical memory is usually regarded by the rememberer as being 'recalled', it is often demonstrably the reconstruction of an event rather than a reproduction or play-back of what was originally seen. Nigro and Neisser (1983) point out that reconstruction must have occurred in those cases where rememberers say they can see themselves in their mind's eye taking part in the event recalled.

Conway (1991 p.169) proposes "that autobiographical memories are not pre-stored in memory in the form of more or less discrete units, but rather that memories are dynamically constructed on the basis of knowledge drawn from different memory structures." He posits a 'phenomenological record' of fragmentary knowledge of past, event-specific experiences Separately stored, is a body of thematic knowledge which indexes the phenomenological record. The final contributory determinant is the current configuration of the self, which will decide goal structures, attitudes, beliefs and ways of processing consistent with personality. Thus, an autobiographical memory is reconstructed from a synthesis of phenomenological record, thematic knowledge and the self.

According to some researchers, generative reconstruction involves three cyclical phases (Williams and Hollan 1981, Norman and Bobrow 1979). The first stage constructs a retrieval context, the second uses the context to search long-term memory, the third evaluates the output from LTM. Successive generative retrievals involve cyclical repetition.

Conway's phenomenological record is assumed to consist of a huge number of discrete fragments that record moment-by-moment conscious experience, including

affect, during an event Each fragment will record only the content of consciousness that persisted during a particular moment of encoding. If the number of moments to be stored during a normal life-span seems too large to be physically possible, it should be borne in mind that the brain contains thousands of millions of neurones, and at least ten times as many glial cells, so that the possible network of combinations is almost infinite. To put this into quantitative perspective one might reflect that all that has ever been written, or ever will be, in English, French, German, Spanish, Italian - in short, using the Latin alphabet, uses combinations of only twenty-six letters. In any case, the recording of phenomenological experience is far from complete. This, as cited by Conway (1991 p.174) was clearly illustrated by Ribot as early as 1883, when he wrote:

> "I recall at this moment very vividly a visit which I made a year ago to an old chateau in Bohemia. The visit lasted two hours. Today I go over it again readily in imagination. I enter by the great door, I traverse in order courts, corridors, halls and chapels; I see again the frescoes and the decorations; I find my way with ease through the labyrinth of the old castle to the moment of departure. But it is impossible for me to conceive of this imaginary visit as lasting two hours. It seems much more brief."
>
> (Ribot 1883 pp.58-59).

The memory is apparently an incomplete record of the original experience.

Experimental evidence (Johnson et al 1988, Brewer 1988, Whitton and Leonard 1981, Ross 1984, Schank 1986) strongly suggests that the phenomenological record is separately stored in LTM. This is confirmed by Cermak and O'Connor (1983) in their study of an amnesiac patient SS whose recall of thematic knowledge, as related to self, was unimpaired but who could not retrieve specific

autobiographical memories. They concluded that neurological impairment denied access to the phenomenological record.

Another case with an interesting difference was reported by Stuss and Gusman (1988). Here, impairment was to the access of both phenomenological and thematic records. The patient could recall no information about his pre-traumatic past. When he succeeded in relearning some such information it evoked no affect or feeling of self involvement. The fact that this patient, V.J., later fully recovered his memory does not alter the fact that during the phase during which he had relearnt to access both phenomenological and thematic information, his access to reacting self was still denied. Taken together, the above examples appear to demonstrate the separate functioning of all three components, phenomenological, thematic and self. Reconstruction of autobiographical memories is facilitated by the way the components are stored. For example, Landauer (1975) proposed the phenomenological input is randomly stored, with temporally contiguous records in closely adjoining brain locations, thus speeding the search process.

In conclusion, the mechanism for generative reconstruction of memory outlined on the previous pages, accords well with the two main hypotheses of this thesis. The inclusion within a memory of affect as experienced by the self, is posited as one of the essential determinants, while the flexibility of the system contributes crucially to the long-term adaptive function of autobiographical memory. It is arguable that reconstructed memories of the kind described above have greater functional (or adaptive) value than copy memories would have. Current experiences are rarely, if ever, exact replicas of previous experiences, so that a memory that is a copy will fail to match and will not be used to guide response to the new situation. Reconstructed memories have greater flexibility and so are more likely to apply to

new experiences that are similar but not identical to previous experiences. The absolute necessity for such flexibility is nowhere more apparent than in childhood memories, where cognitive and interpretative development, and new experiences are constantly enlarging and refining the memory store.

1.4.4 The Role Of Emotion In Autobiographical Memory

It is one of the main hypotheses of this thesis that autobiographical memories, including those of childhood, contain an emotional / affect component that gives them their long-term and their life-span adaptive value. The presence of a strong affect component has also been found to determine the enduring quality and vividness of recall. This is particularly marked in the case of Flashbulb memories. These are exceptionally vivid memories of events that have the qualities of surprise, importance, personal significance and emotion. Typically, such memories have been reported for dramatic public events such as the assassinations of public figures. Conway (1990 p.83) writes: "Emotions may play a crucial role in Flashbulb memory and vivid memory formation." Larsen (1991 p.64) suggests the primacy of personal emotion in Flashbulb memories He proposes that the vividness of Flashbulb memories may derive from the strength of the individual's emotional arousal at the time of learning of the event, rather than upon the content of the event itself. In other words, a crucial factor is the emotional shock to the rememberer's self, while the content of the shocking news acts as a context in which the emotion aroused took place. Such a view would explain why Flashbulb clarity is by no means confined to the recall of public events (Rubin & Kozin, 1984). Private events, especially in childhood, can elicit strong emotions, too. Thus, in childhood, events that appear trivial by adult standards can be strongly emotional and have Flashbulb vividness at recall.

Several researchers have noted how, in real life, learning about a news-worthy, traumatic event often results in persistent and vivid recall not only of the event, but also of unrelated personal details that applied at the time, for instance, exact location and activity, clothing worn etc. (Brown and Kulik 1977, Pillemer 1984, Rubin and Kozin 1984). Simulated laboratory research has confirmed this (Christianson, Loftus, Hoffman, 1991).

There is thus evidence that the emotional component in autobiographical memory is facilitatory for both vividness and persistence, both of which are essential to the adaptive function of autobiographical memory.

1.5 Organisation Of Autobiographical Memory

Retrieval of information from long-term memory, or indeed from any kind of storage system, is critically dependent on how that information is organised in store. Thus, the organisation of autobiographical memories plays an important part in the retrieval of both adult and childhood memories.

There is wide consensus among researchers today that the organisation of autobiographical memory is hierarchical. However, as Ribot (1882) pointed out, a hierarchy can be constructed out of many different categories; temporal, thematic, activities, locations, life chapters etc. Various researchers have focused on different types of hierarchical structures.

Kolodner (1983), for instance, proposes a structure built around event organisation units (E.MOPS). Reisser et al (1985) favour an activity-based model, from which recall is best facilitated by appropriate activity cues. Barsalou (1988) agrees with neither. His model consists of both temporal and thematic categories in an interlocking hierarchical structure. The structure is inferred from the relative efficacy of different types of cues in mediating recall. He reported three studies in which the cue types relating to examples of free and cued recall were categorised. He found that extended events, rather than specific instances provided an hierarchical structure of levels, each focusing on different themes drawn from the subject's life experience. For example, the recall of 'pitching camp in the rain' could be a 'descendent', at four removes, of an extended event related to a life period, namely holidays, summertime, while a junior student at college. The choice of the theme at each hierarchical level is entirely idiosyncratic and might relate to self-imposed goal orientation.

Barsalou refers to his model as one of "extended event time lines" that lead from one hierarchical level to the one below. In this respect it is similar to Ulrich Neisser's model of nested memories (1985). There is also common ground between Barsalou's model and Schank's proposal that memory structure is around themes (TOPs) and event characteristics (MOPs).

Schank and Abelson (1977) proposed that knowledge, resulting from frequently repeated experiences, becomes stored as a kind of typical scenario or set of expectations, which they called a Script. The best known example was "Going to a restaurant," and contained all the usual elements such as sitting down at table, studying a menu, ordering the meal, paying the bill and leaving. Of course, scripts are not confined to actions and events. They will include expectations about appearance and behaviour regarding actors and roles.

It is interesting, and especially relevant to childhood memories, that the concept of a structure of expectations built on repeated experience is what Piaget called a Schema in describing how a young child acquires knowledge of the world. (See Chapter 2). The script model suggests there is no reason to expect the process of acquiring scripts to stop with maturity, only perhaps to diminish if, as is usual, increasing age brings fewer new experiences.

Piaget recognised that a schema relating to any particular kind of experience would need to be enriched or adjusted in the light of new input, and that if a new experience proved too incompatible to be accommodated within an adjusted existing schema, then a new separate schema would need to be created.

Similarly, Schank came to realise the inadequacy of a self-contained restaurant script, since far from being self-contained in real life it would need to accommodate many other scripts relating to different kinds of restaurants and different reasons for going to them. Martin Conway (1990 p 106) enumerates several variants. In 1982 Schank reformulated his memory structure and extended it to five levels. The first of these he calls a Scene, i.e. a general description of a setting for a particular type of activity, e.g. a restaurant. The second level, a Script, represents a specific realisation of a scene, e.g. a particular visit to a restaurant. This will draw upon the third level, a general store of different scripts that may be appropriate to the experience. i.e. kinds of restaurants, kinds of occasions, social purposes, location, means of travel, etc. Each of these scripts is a fragmented element in the memory store, so that an autobiographical recall of a particular restaurant occasion is not the accessing of a discretely encoded event; instead, it is a dynamic reconstruction of the event from appropriate elements in such of the separately stored scripts as may be relevant.

The selection of the right elements to reconstruct into a memory is helped by Schank's fourth and fifth levels. These are Memory Organisation Packets (MOPs) and Thematic Organisation Points (TOPs). MOPs group together features often found together within scenes. They can thus be used to index a search in applicable scripts for what might constitute a specific memory. TOPs serve to index abstract similarities in possibly very different experiences. By way of example, Schank (1982) cites how the disappointment felt by X because his wife would not cook his steak rare enough triggered a memory of years ago in England, when he could not get his hair cut as short as he wanted.

Bartlett (1932) used the term Schemas to describe units of knowledge that loosely group together representations of past, personal experiences and resultant feelings... " because all that goes to building of a schema has a chronological as well as a qualitative significance, what is remembered has its temporal mark; while the fact that it is operating with a diverse organised mass, and not with single undiversified events or units, gives to remembering its inevitable associative character." (p.207) Perhaps Bartlett's most lasting contribution to the understanding of memory was his emphasis on the dynamic nature of remembering. He wrote: "Images are dynamic, living, constantly undergoing change under the persistent influence of our feelings and ideas" (p15). He had a major influence on the reconstructivist view of memory described in section 1.4.3. Though largely taken for granted today, Bartlett's view became rather obscured, first by mainstream focus on reductionist research programmes, and later by behaviourism. However, the organisation of autobiographical memory in terms of scripts and schemas is widely accepted today.

Returning now to the use of cueing experiments to infer the organisation of autobiographical memory, Conway and Beckerian (1987) found, in a series of three experiments that the most successful cueing prime for the recall of autobiographical memories was life-time period and not semantic category cues. They therefore proposed that, at one level, autobiographical memory is organised in "knowledge structures that represent life-time periods." These are referred to as autobiographical memory packets (A-MOPs). The primacy of 'life-period' is, of course, in accord with the views of the many researchers today who hold that autobiographical memory is about the self.

Models of the structural organisation of autobiographical memories are, of necessity, inferred by relating cueing characteristics to ease of recall. Linton (1986) applied this criterion while reviewing her own longitudinal study of daily diary entries. She concluded the linking factor that characterised her structure was "mood tone." This echoes Bartlett's belief. Within the primacy of "mood tone," Linton also found that more recent memories are stored temporally, and more remote ones categorically by themes.

Thematic linkage is also likely to provide initial entry into a nested hierarchy as proposed by Neisser (1985). Yet thematic consistency between levels within the structure is unnecessary, and indeed, unlikely (as in the Barsalou model). Any complex event will probably generate the encoding of several diverse aspects of the experience. Recall of a wedding, for instance, can involve moving among nested images of what the bride looked like, the ceremony, the location, clothes worn, parents and particular guests, the reception afterwards, speeches, etc., any one of which, if suitably cued, can open the door to "moving about" within the hierarchy.

In conclusion, it will be seen that the models described share many characteristics in common. They acknowledge the self as the pivotal centre of autobiographical memory; they recognise the dynamic nature of the remembering process, and a flexibility of structure that enables modifications to be made in the light of new experience or change of mood. However, all these models relate primarily to remembering adult experience. Young children will not have had enough life experience to enable them to categorise events into themes, or to particularise life periods. These differences will be considered in Chapter 2.

1.6 Retrieval From Autobiographical Memory

Inevitably, a great deal concerning retrieval has already been included in the previous sections for the processes discussed are inseparably linked. So here, where possible, discussion will be confined to theory and findings directly focused on retrieval strategies and cues that trigger recall. Three kinds of autobiographical memory will be looked at: 1) Intentional remembering; purposeful effort to recall something specific from the past; 2) Involuntary memories; those that come to mind unsought; 3) Reminiscences; an unrestricted free-wheeling of recall, voluntary but not goal-directed.

Intentional Remembering

Intentional remembering occurs in response to a cue which may be a word, a question or a current experience. It is quite likely that a cue will facilitate entry into the memory hierarchy at some point other than the apex of contextual generality. Consider a common example, looking at an old holiday snap album. The snap of 'you both' basking in the sun on that beach may well prompt memory to jump straight to the MOPs stage (the seaside holiday) and then to the recall of a specific event. From there, memory, may or may not choose to "move about" as Neisser puts it among the rest of the nested associations.

The efficacy of MOPs in cueing specific recall was empirically shown by Abelson, Black and Reisser (1985) in two experiments. Thirty-six Yale undergraduates were asked to recall a personal experience that would fit a combination of two separate phrases. The first was a MOP of some common activity, for example "took a ride on a train." The second described a general scene, such as "paid at the cash desk." These were presented in alternate order.

Retrieval time, measured after the second phrase, was significantly faster when the MOP was given first. This suggested it is the MOP structure that provides the context needed for retrieval. When a general scene comes first, it is still necessary to reconstruct a more specific MOP, and unless this happens to fit the second phrase MOP, extra search time will be required.

In the second experiment they used three types of cues: 1) MOP alone, 2) MOP plus scene, 3) Scene alone. The fastest response was for MOP alone. This confirmed that a MOP was more efficient than a scene, and that a combination of both merely slowed response by imposing an additional constraint. These results suggest that a MOP provides the optimal level of specificity for a memory cue. However, not all researchers have found MOPs to be most effective cues for retrieval.

For instance, Linton (1975, 1978, 1982, 1986). She recorded events in her life daily over a period of six years and then observed her own retrieval strategies over a period of twelve years She found her most successful strategy, by far, was "simple chronological order" (62.3% success), followed by "categorical summary" (23.2%).

Wagenaar (1986) used a similar procedure. He recorded diary entries over a period of six years, but for each entry he noted who, what, when and where. He found 'what' cues were best at evoking recall. 'Where and who' came next, while 'when' cued little response. However, he also found that combinations of more than a single cue made a big difference in favour of retrieval, and that if 'when', so ineffective by itself, was added as a second cue it greatly increased response. An

explanation for the greater success of multiple cueing could lie in the resultant narrowing of the context, and corresponding increase in specificity. The efficacy of 'when' added to 'who, what or where' could result from enabling the combined cue to define a sort of mini-life-period, and so again to sharpen the specificity.

A retrieval strategy that enlists the help of semantic knowledge is "subject enumeration." Whitten and Leonard (1981) cite its frequent use by students when trying to recall the names of their teachers at high school. The technique consisted here of mentally drawing up a semantically based list of school subjects taught and fitting names to them. Arguably, this strategy assists the recall of what Conway (1990) calls "knowledge of autobiographical facts" and not autobiographical experience in the sense of remembering participation in an event.

Verbal protocols of remembering suggest that search strategies often incorporate verification checks at various points. Most interviewers are familiar with such self-interruptions as "...No, it was the Tuesday - definitely - 'cos Wednesdays he always left early for..."

In the present research, the answer to the question: "What sort of thing brings this memory to mind?" most often refers to something visual. But cues can, and do include every one of the senses. Taste and smell, when they apply, can be particularly effective.

However, though not invariably so, autobiographical memory usually does involve imaging. In fact, Brewer (1986) describes autobiographical memory as 'image-based', and in a later experimental study (1988), he shows a positive correlation between the amount of imaging and veridicality. He found visual imaging to be by

far the most common, a finding published earlier by Smith (1952) and confirmed in the present research.

The paramountcy of visual imaging may explain why, according to most subjects, it is visual cues that most commonly evoke personal memories for them. Visual dominance may well go further. The cueing power of words and ideas may also be partly determined by the ease with which they can be imagined in the mind's eye. Thus, in studies of cue word recall, many researchers have found that object words draw faster response than emotion words. The present research confirms this in Study 2. Objects can be visualised, emotions in the abstract cannot.

A recency effect in the recall of experienced events has been noted by many researchers; inter alia Whitten and Leonard (1981), Baddeley and Hitch (1977). Conway (1990) points out that, as a general tendency, recency would have adaptive value. Recent information is likely to be more relevant to present needs in a changing world than more distant recall from the past. Yet, however valuable recency may be in general, its strength as a determinant of recall is eclipsed by particular personal interests. Thus, in the study by Baddeley and Hitch (1977), where recall of games played during the season by a rugby team showed a strong recency effect, the game remembered almost as well as the most recent was the only one they won - mid season.

Involuntary Recall

Sometimes aptly called 'pop-up' memories, such recall comes unsought and unexpectedly to mind. It can, of course, relate to any life period, but is most striking when it represents a scene or event from the forgotten past, for example,

early childhood. By definition there is no retrieval strategy and often the cue is not identified.

In a penetrating introspective study Esther Salaman (1982) discusses instances of her own involuntary recollection of "forgotten" childhood experiences. They come "unexpectedly, suddenly and bring back a past moment, accompanied by strong emotions, so that a 'then' becomes a 'now'." Her examples differ from most childhood memories in that they had never been consciously rehearsed before. The information they presented came as new to her, though rationally she assumes she must have once known and forgotten. In this connection she quotes Dostoyevsky: "Some people appear not to think of their memories in childhood, but all the same, preserve such memories unconsciously." this is confirmed by several instances in the present research, where subjects declared with some surprise that they had never remembered the event "till now," and yet described the memory as vivid.

On the question of why autobiographical accounts of childhood are usually not written till late in life, Salaman (p.50) believes authors show special understanding. She cites De Quincey and Asakov, who both said that for them their childhood was 'dead' in middle years. De Quincey believed that childhood memories are not forgotten, merely "waiting to be revealed when the obscuring daylight shall have withdrawn." Proust is quoted as writing "The echo of a childhood memory never ceases, but is not audible until life grows quiet, like convent bells whose sound is drowned in the noise of the day and is heard again in the silence of the evening." (Salaman herself was aged 70 when she wrote about involuntary recall).

Turning to the inexplicable nature of cueing when recall is involuntary, Salaman quotes from Chateaubriand's "Memories d'Outre-Tombe," where he says that

hearing the song of a thrush cued a happy memory of another time and place, long ago, where he used to hear thrushes sing. This cue is clearly insufficient, for he must have heard thrushes singing many times without triggering this memory. A similarly inexplicable cue concerns Marcel Proust, quoted from his "Jean Santeuil". Here, when he catches sight of the Lake of Geneva, Marcel is involuntarily transported in a childhood memory to a sea-side place in Brittany. But why? The two could scarcely be more dissimilar in appearance!

In both the above cases, the inadequacy of the objective cueing suggests the triggering association was really subjective. This is also likely, when Salaman (p.54) found it possible to experience generalised, as opposed to specific, involuntary memory in the form of a feeling of acute homesickness for Russia. This, she recognised as nostalgia for her childhood - a feeling shared by many subjects in the present research.

Details of the three autobiographical childhood events reported by Salaman need not concern us here. Their veridicality is, in a way, irrelevant; one she admits she images in the wrong house, and all three are demonstrably vivid reconstructions. The point is that the elements from which the reconstructions are made have not been forgotten. Nor have the strong emotions which they bring.

Reminiscence

Esther Salaman writes that once a nostalgic event from her childhood has returned to her memory, she cherishes and rehearses it. This is the essence of reminiscence - voluntary rehearsal, usually for pleasure. However, it is particularly associated with the elderly, and often focuses on childhood and early years.

This finding emerged from an investigation in homes for the aged over a period of fifteen years by Coleman (1986). He found motivations for reminiscence differ both categorically and in degree. Not all his subjects reminisced. About 12% deliberately avoided doing so because they found their past unpleasant. Amongst those that did reminisce, 16% were troubled by their memories. The model group 42% were of high morale and enjoyed reminiscing. There were also among those of high morale 30% who did not deny reminiscing but saw no point in it.

The enjoyment experienced by those who reminisced was not necessarily derived from recall of pleasant experiences. Sometimes, it involved stress, danger, or hardship; the satisfaction lay in having overcome it. The 'self' had won! Such struggles naturally related, for the most part, to active, adventurous life-periods, often in the subject's early life.

Reasons for reminiscing may also include the plain fact that old age has little to look forward to, and much to look back on. For many, a memory excursion into carefree, nostalgic childhood might make a pleasant break from the uncompromising monotony of the present.

The retrieval of autobiographical memories is, of course, central to every aspect of the research reported in chapters 4, 5 and 6. However, because of the exploratory nature of this research, it was considered essential to avoid any researcher-influenced constraints upon retrieval methods. In Study 1 free recall was invited of any event within a given childhood age span. Cued recall, used in Study 2, again imposed no constraints on what the subjects chose to recall. The third study concerned the remembering, or not, of specific information known to the subjects in childhood. Subjects were not asked in any of the three studies to report on the

retrieval strategy they were using. Such enquiry was deliberately avoided as it was felt that any procedural self-analysis would be strange and unfamiliar to subjects, and would probably inhibit the free flow of memories.

1.7 Chapter 1 - Summary

- The aim of the research is to identify the determinants of childhood memory

- Using an exploratory approach, the research addresses the following questions:

  i) How young does autobiographical memory start?

  ii) What sort of events are remembered?

  iii) How vivid are childhood memories?

  iv) Which senses are involved?

  v) How did people feel at the event and at recall?

  vi) What triggers childhood memories?

  vii) What is the personal meaning of what is recalled?

- Two assumptions are made and justified; that autobiographical memories have adaptive value and that they contain an affect component.

- The theoretical framework for the research was outlined in terms of the relationship of autobiographical memories to other kinds of memory; the nature and properties of autobiographical memory and its functions.

- Current views on the retrieval of autobiographical memories were discussed, including the process of reconstruction; the role of emotion; models of organisation and the efficacy of different types of cue and research strategy.

This chapter has focused on theories and findings that relate primarily to determinants of adult memory. The following chapter addresses issues that are specific to childhood memories.

CHAPTER 2

Theoretical Issues About Childhood Memories

2.1 Introduction

Memories of early childhood are, of necessity, limited by the stage of cognitive development reached by the child at the time of the event. This differentiates them from adult-encoded autobiographical memories in two important ways. Firstly, the 'facts' of an experience might be wrongly understood. This would change what Nelson (1991) has called the "What happened" element, and would consequently distort the "What I felt about it" component.

Secondly, an event that an adult would recognise as important, might not be seen by a young child as having any personal significance, eg the assassination of a President. In such case, it would probably not be encoded at all, and might be wrongly written off as 'childhood amnesia' (see 2.6).

It is, therefore, hypothesised that as a result of cognitive development, memories encoded during different age-spans of childhood will show differences both in the content and the qualities of the memories. It does not follow, however, that there would also be differences in the strength of the affect factor, for this need not relate to cognitive accuracy, and is noticeably functional in babies from birth.

This chapter reviews current views about the development of memory ability in children since these are crucially important for understanding the differences between childhood memories originating from different periods of childhood.

2.2 Developmental Differences

At a physical level, Parkin (1987) draws attention to the fact that in the brain the hippocampus and amygdala take some time before they reach full development in a child. Both are known to be important parts of the brain's mechanism of memory (Milner et al 1968, Rose 1992). Whether, and how, neurological immaturity limits remembering is, as yet, uncertain. However, far more is known about the cognitive aspects of development during the years of childhood. Research in this field owes much to the seminal work of Piaget as well as to more recent researchers.

2.2.1 The Piagetian Account

A prediction concerning the kinds of memories to be expected at different encoding ages can be loosely inferred from Piaget's descriptions of the developmental characteristics commonly found in each of the encoding age groups used in this research. Piaget (1973) categorizes these as:

Age under 3	Sensory-motor / pre-operational Totally egocentric.
Age 3 - 5	Pre-operational Still egocentric. Also, centering on one aspect of an object, to the neglect of other aspects, so distorting reasoning.
Age 6 - 8	Concrete operational A solid bedrock with which to construct the present from the past
Age 9 - 11	Concrete operational (continued) At objective levels of reality, existing schemas can be modified to accommodate new information.
Age 12 - 14	- Formal operational

and 15 - 18 A great influx of abstract ideas and ideals about the self, the world and potential human relationships. Frustration because the scope of desires has greatly expanded, while the ability to fulfil them has not. Self conscious awareness.

Piaget's categorisations point to a progressive widening in the scope of children's autobiographical memories, from mere sensory encoding to interpretive understanding and organisation as the child's knowledge increases.

An interesting example of understanding growing with age, consistent with Piaget's categories, is empirically provided in an experiment by Wimmer and Perner (1983) in their studies of 'Theory of Mind'. This experiment illustrates the way interpretation of events is limited at a stage when the child is not able to understand the point of view of 'other minds'. A child was asked to put a chocolate into a box and was then briefly taken out of the room with a promise that, on return, the chocolate could be taken out and eaten. A second child, already watching in the room, was then told to remove the chocolate and replace it in a basket. This second child was then asked where will the first child look for the chocolate on return to the room. Most three year old children wrongly indicated the basket, while by age four, most children correctly chose the box. This suggests that younger than around four, children may not be able simultaneously to conceive the possibility of a model of reality that differs from their own experience.

Piaget recognises that, with cognition not yet at adult level, but with emotions fully active (though not necessarily stronger than in later years) the affective component in childhood will have a bigger role to play than in adult encoding. When Piaget (1969) wrote: "An individual first experiences affectively before he can

comprehend or use his understanding," he was referring to childhood memories. However, as outlined in Section 1.4.4 many researchers, before and since have accorded primacy to affect as a determinant of adult personal memories (e.g. Bartlett (1932), Nelson et al (1983): "Goal orientation is always affective motivation", Robinson (1980), and many others). Here, however, the question is not one of primacy, but of relative balance between affect and cognition, the two parts that are hypothesised as constituting an autobiographical memory.

2.3 Developmental Differences - Scripts and Schemas

Though Piaget's findings have never been seriously challenged, there are other ways of addressing the issue. For instance, Schank and Abelson's proposed structure of scripts and schema's was discussed in Chapter 1 in relation to adult memory, by which time life experience had already built the schematic structures. But life experience starts in childhood, and so, therefore does the building of schemas and their adjustment to accommodate new information. The need for flexibility to make adjustments, though constant throughout life, is never greater than for the expanding memory store of a growing child. Nelson (1991 p.9) points out that memory storage in the form of flexible schemas based on expectation drawn from experience, accords with her own developmental / adaptive approach "Memory for recurrent conditions and routine actions is most valuable for an organism's adaption to its environment. The connection with early schema development is obvious." So is the relevance to childhood autobiographical memory. "A schema", writes Nelson, "need not be true or correct to be part of the system." Schemas she reminds us, are based on both fact and affect. They are not only reminders of "this is how it usually happens," but also of "this is how I usually feel about it." Many would recognise the truth of this in relation to a 'visit to the dentist' schema.

Behaviourally, the affective factor is influential. If it is positive, we are encouraged to welcome, and possibly seek a repetition of the schematised experience. If it is negative, then we shall try to avoid it, which in turn, may lead to avoidance behaviour, such as taking extra care in looking after one's teeth to minimise visits to dentists. Neutral feelings about something are also behaviourally influential.

For "I have no feelings about this activity" means I shall not bother to seek it, but nor shall I take any steps to avoid it.

Probably the earliest schemas to enter the memory system are procedural (Rose 1992). This would accord with Piaget's findings that until the age of about two, infants are egocentrally concerned with learning to cope with their environment. The earliest practical use to which a schema is purposefully applied may well be knowing how to get mother's attention. This would probably result from the fact that mother usually did come in response to instinctive cries of discomfort such as pain or hunger. Repetition, however, would schematise the experience into useful knowledge that crying would bring mother for whatever reason.

Nelson (1991) argues that, though logically input must precede storage, the nature of the memories' storage system will determine the way input must be encoded to be put purposefully within it. There is, perhaps, more of an holistic unity and less of a 'chicken and egg' conundrum about this if one relates it to Bartlett's (1932) reminder that, to be meaningful, a memory is not just of something but about its relationship to something else. In other words, an event memory would be meaningless without its context. In this light, the schematic structure and the events that built it are really aspects of the same life experience.

Nelson et al (1983) suggest that for very young children, the generalised scripts based on repeated experiences are acquired before the ability to isolate or report specific events. Evidence is provided that infants can answer general questions about, for instance, going to bed or what do they do at playschool, but find it harder to answer specific questions in relation to the same contexts, such as "What did you do at play-school today?" It is, of course, possible that the child's

difficulty may arise from the fact that often nothing memorable will have had happened 'today' to lift it out of the repetitive uniformity that enabled the generalised schema to be built.

2.4 Developmental differences - Social Interaction

Self coherence and social interaction were listed in Chapter 1 as adult functions of autobiographical memory. But, as also with the building of schemas, the process begins early in childhood. Fitzgerald (1988) suggested that memories from early adult life form part of a personal narrative, which sets the developing self in a social and cultural context. There is evidence (Fivush et al, 1987) to suggest Fitzgerald's statement could be amended from 'early adult life' to from 'early childhood'.

Social intercourse begins with mother / baby talk. Nelson (1991 p.9) reports on an exceptional twenty-seven month-old child initiating social interaction with a "do you remember, Mommy?" conversation. It is not surprising that the acquisition of linguistic skill should be used early to describe, and so stabilise, personal experiences in the child mind.

This is well illustrated by Nelson's transcription of 2.5 year-old Emily's cot talk, in which she runs through recent events in her own mind before falling asleep. This verbalised rehearsal is, of course, providing the required repetition of key elements that will enable their assimilation in generalised schemas as discussed in an adult context in Section 2.3. From this observation, Nelson (1987) concludes that "The basic ways of structuring and interpreting reality are consistent from early childhood to adulthood."

Nelson (1991) sees the role of repetition as central to childhood memories She theorises that basic episodic memory is a temporary holding system, and that if experience is not 'reinstated' by repetition it will not be remembered for longer than

six months at most. This is offered as an explanation of the transient characteristics of many very early childhood memories, which are vividly recalled for days, sometimes weeks, and are then completely forgotten.

Reinstatement by rehearsal is greatly assisted by talk. Pillemer (1984) and Fivush and Reese (1992) all draw attention to how a progressive mastery of narrative style leads to more social interaction. Narration involves structured formulation that helps retention in memory and the shaping and sharing of autobiographical experiences. The adaptive roots of this symbiotic partnership are examined in the next section.

2.5 Developmental Differences - Language Acquisition

Despite the important facilitatory function of language in personal and social development, discussed in the previous section, language may play a relatively minor role in childhood memories younger than about 5 - 6. Sensory recall is predominantly visual and does not include words at all. Neither the visual imaging nor any related affect are likely to have been verbalised by a young child at the time of encoding, though it may be verbalised later in conversation. Consequently, the memory may contain no linguistic ingredient, and will be recalled as an experience, that is, as it was experienced without words. Wolfgang Kohler (1947) points out that we can be aware and remember without words. He draws attention to the common experience of walking down a street. We shall observe many things, all of which have names, but we shall feel no need to name the things we see.

However, even when language is no part of the memory, it is inevitably involved in the verbalised telling. This is of two kinds. There is telling someone else, who presumably does not already know. And there is telling oneself what is already known, reviewing mentally but still using words. Adults will usually do this silently, while very young children may utter the words aloud, as in Emily's cot talk (see2.4).

In the first case, telling someone else, language will be used selectively to emphasise, condense or make a better story. For, although personal memory belongs to the unchanging self, the telling of it focuses outside the self; it is directed at someone, for whom it needs to be made appropriate. Such modified rehearsal, if repeated, may result in actually re-coding the memory to suit the teller's preference. Piaget's (1973) finding that children below age three are

markedly egocentric would seem to make it less likely that, unlike adults, young children would be concerned with suitability for a particular audience. In any case, young children would have only limited linguistic skill with which to refine narration.

In the second case, telling oneself, verbalised rehearsal is less likely to change the memory, for it is more in the nature of a commentary on something which is already being recalled. Re-coding is, nevertheless, possible The 'self' may prefer a more favourable version in which some selected details are stabilised, or even enhanced, while others are omitted or modified. Bartlett (1932) cites such instances in relation to memorising stories, which sometimes become altered to comply with the teller's norms. Freud's (1915) accounts of total suppression or the infantile screening of unpleasant memories offer extreme examples.

Thus, the acquisition of language skill can modify narration, stabilise a memory, or can be instrumental in re-coding what is remembered. Yet, despite these links, remembering and narration are two quite separate functions. This is very apparent in the ease with which a multilingual speaker can tell about a single experience in more than one language. (A different situation applies if a memory has been retold so often that what is being remembered is not their experience itself, but a performance in a particular language).

Nelson (1991) writes concerning the emergence of autobiographical memory: "This question must be approached, in my opinion, from the perspective of the function of memory systems in evolutionary, adaptive terms." Viewed in this light, it is seen that language and memory are symbiotic twins, whose adaptive value depends upon mutual development. Thus, a prerequisite for personal survival, the

ability to learn from experience, depends upon an ability to remember the past, or 'what happens when. .'. To share such personal knowledge with others, and so enable co-operative planning and behaviour demands a language sophisticated enough to match the complexity of the information involved. Hence the inevitably mutual evolution of language and episodic memory. According to R. Leakey and R. Lewin (1992) most anthropologists today believe the process began over 2 million years ago. But in a changing world, it probably still continues. So, when considering determinants of autobiographical memory, Nelson's view suggests one should include the essential link with language which determined the origins and gave adaptive encouragement to episodic remembering.

Perhaps the most important property to have evolved in human language is escape from the present tense and location, known as displacement. This freedom has given humans the use of narrative communication, thanks to which this weakling among the beasts could win by organising mind as well as muscle As children develop language they are able to represent their memories in ways that are freed from the spatio-temporal context of the original experience. This allows them to begin to use their autobiographical memories to fulfil the functions of planning, problem solving and decision making.

2.6 Childhood Amnesia

Opinions about the extent and duration of 'childhood amnesia' vary, but probably no-one today believes it to be total. Rich memories from early childhood are too common for that. The term can only mean a deficiency in the ability to remember early autobiographical events, below some expected criterion. What this criterion should be still remains largely unresolved. Early research into childhood memory, thoroughly reviewed by Dudycha and Dudycha (1941) does not appear to address this question. Perhaps, in exploring such aspects as stability, veridicality and affect, researchers saw no need for a yard-stick to establish a norm.

More recently, attention has turned to quantitative studies that have looked at the distribution of memories, including those of childhood, across the life-span. (Cohen and Faulkner 1987, Waldfogel 1948, Crovitz and Quina-Holand 1976, Crovitz and Harvey 1979, Crovitz, Harvey and Mckee 1980). Rubin (1982) produced experimental evidence that memory was subject to a natural decline of retention that is progressive as the retention interval increases. However, Weltzer and Sweeney (1986), on reworking Rubin's data, found that the regression of his retention factor for the life-span from above age 8 did not fit the earlier period of birth to 8, when less was retained than predicted. A specific yard-stick for childhood amnesia was claimed by Crovitz and Schiffman (1974) when they formulated a "power function regression equation that defined normal homogenous forgetting." Applying this in three experiments, they found that the number of memories for age 6 and below was less than their norm. Thus, the existence of childhood amnesia was, perhaps for the first time, quantitatively shown.

But if by amnesia we mean forgetting, as the use of a forgetting norm implies, then can we be sure? Such measurements assume that something was encoded in infancy which should, by normal criteria have been remembered, but was not. Hence, it has been forgotten. The validity of this conclusion rests on an assumption that autobiographical events are encoded in infancy at the same rate as in later years. There is no known basis for such an assumption. There are powerful arguments against it. Paucity of infant memories may well result chiefly from less encoding rather than more forgetting.

When one considers the vast amount of learning about the physical and behavioural aspects of the world that even the dullest child accomplishes during the first three years of life, it is clear that a child's mind is fully capable of procedural and semantic memory retention. But all this remembering belongs to the child's gargantuan task of learning about its environment, and to acquiring and improving bodily and instrumental skills to deal with life. The task is urgent and formidable, so at the start, it is likely to be a full time job for infant memory. Acquisition of autobiographical memories can wait.

As Nelson (1991) has suggested, it is only when this schema building process has accummulated a sufficient data bank of facts and skills, that competence and knowledge of the world can combine to allow the child mind to appreciate the holistic nature of an autobiographical event; to see the personal meaning of the experience, rather than to focus on one of its aspects, what Piaget calls "centration."

Until then, what would be regarded and remembered by an adult as an event, for example infant Johnnie toddling unaided into the room for the first time, might not

be encoded as such by the infant, whose attention would probably be fully occupied by the procedural memory concerned with the technique of walking.

The turn around from a focus on particular aspects and skills to a wider grasp of an event's meaning is, of necessity, gradual and prolonged. It demands repetition of the experience until procedural skills and semantic knowledge become 'internalised', to use a Piagetian term, and so can be put out of mind. Only then can full attention be paid to autobiographical experience.

When searching back into childhood memory we cannot possibly isolate the countless 'mini episodes' that occasioned the acquisition, repetition and refinement of our skills and knowledge of the world. But that is far from saying we have forgotten. Much more usefully, we have synthesised our memories of fragmented experiences into more holistic schemata, and it is selective encoding priority that has enabled us to do so.

Reference to encoding rather than to retrieval as the possible prime factor in childhood amnesia has been made by Waldfogel (1948), who ascribes the relative paucity to "encoding deficiency, lack of intelligence, which will correct itself as children grow older." Cohen and Le Voi (1986) also speculated that a young child will "not yet have developed the general knowledge schemas needed to interpret, organise and mentally 'index' early memories." This is, of course, consistent with Piagetian theory exhaustively documented in Cook (1970), Flavell (1963), Beard (1960), Piaget and Inhelder (1973).

However, from an adaptive viewpoint, the early encoding limitations appear not as a deficiency, but as developmental efficiency; an essential early concentration on

mastering those elements of procedural memory and semantic understanding of enviroment that enable the formation of schemata, without which the child could not later ascribe meaning to experience and encode it meaningfully into autobiographical memory. In short, without this early 'amnesia', the development of later memory would be, at best, retarded.

Freud (1914) in "Psychopathology of Everyday Life" expressed doubts that children, so evidently good at remembering, could really forget the first years of their lives. By 1916 he had formulated his elaborate theoretical structure on how infant amnesia "veils our earliest youth from us and makes us strangers to it." (Freud 1916 / 1953b vol.16 p.326). But today, few would be satisfied with his explanation of unconscious repression to escape the trauma of Oedipus and Electra complexes, or his belief that early childhood memories are really 'concealing memories' used to hide the traumatic ones which are potentially remembered after all, but are defensively screened from consciousness.

More recently, Usher and Neisser (1993) have suggested that more than one cause may be simultaneously involved - a view shared here. For instance, Parkin (1987) points out the young child still awaits further development of brain areas such as the hippocampus and amygdala as well as the acquisition of the wide range of cognitive abilities researched by Piaget and others. But whether this must entail the building of a whole new memory structure, or only developmental adaptations within the juvenile model is a different matter. Nelson (1988) and the present writer, believe the developmental change taking place is primarily one of content enrichment and organisation, not involving any radical change in the basic structure or encoding process.

Nelson examined the organisation of memory in children aged 3 - 5 and 5 - 7 using a framework of schema plus 'tag'. She found no structural differences from the accepted adult pattern. Cues, however, had to be meaningful for the children. A study conducted by Fivush (1988) endorses the importance of the right 'tag' for retrieval. When asked, after a time lapse of one year, to recall a visit to a particular museum, many children could not recall the visit. But when the question was changed to "What had you seen at the museum?", the recall of archaeological exhibits was quite high. Fivush concluded the experience had been filed under 'archaeology' (even though the children may not have known the word) rather than under the name of museum. This study reinforces the view that some apparent childhood amnesia is really a mismatch between the encoding 'tag' of a child's event memory and the cue proffered by an adult mind. This is undoubtedly one of the multiple causes Neisser had in mind when, in 1988 he wrote concerning developmental changes: "Because of these changes, the experiences of childhood do not fit adult schemata. Hence, they can no longer be brought to mind."

Cohen (1996) points to the probability that much of childhood memory is implicit and cannot be recalled to order, but is not necessarily forgotten. Explicit memory is, of necessity, delayed until there is sufficient vocabulary for narration. But even then, failure to retrieve a memory may be because it was never encoded. In other words, instead of a failure to recall, which suggests something amiss, we may be witnessing a 'right and proper' failure to encode

2.7 Prerequisites For Autobiographical Memory

It was hypothesised in section 2.6 that, for young children, there is adaptive advantage in the sequential development of different kinds of memory; ie that in order to develop their adaptively important ability for autobiographical memory, it is a prerequisite to master procedural memory and to gain sufficient semantic knowledge and cognitive skill to recognise the meaning of what is experienced and to organise it mentally in the personal memory store. The fulfilment of this is innately ensured by the natural sequence of infantile development. (See 2.2 et seq)

But what about later years, when understanding has reached adult level? Are there then no longer prerequisites to autobiographical memory? It is proposed here, that there still are, but that they are categorically different. Instead of constraint imposed by the individual's ability to remember, the selection of what to store in autobiographical memory may be to some extent determined by the likelihood that the information will prove adaptively useful in the future. This factor underlies the tendency to remember first-time events and departures from the expected norm.

However, not all first time experience is likely to be equally useful. As Nelson (1991) points out it is repeated experience that is more likely to represent a recurring pattern of events, and so to be adaptively more useful to remember. Consequently, we are not only programmed to learn all we can, and so increase our data base, but also, through a selective process of attention to repetition, to build the knowledge most likely to prove useful into schemata of expectation.

There is widespread concurrence among researchers as to encoding priorities (Cohen and Faulkner 1987, Fitzgerald 1988, Conway 1990). All list novelty,

unusualness and consequent surprise, emotionality and personal importance as characteristic of autobiographical memories. The fact that these qualities are not always listed in the same rank order of importance, may reflect a difference of experimental paradigms, but almost certainly rank order will reflect what is most important in particular circumstances to a particular self. No matter how diverse life's phenomenological experiences may be, it will be the unchanging self that will do the remembering. A coherent and stable self concept must, therefore, rank as the most important prerequisite. As Rubin (1986) put it "Autobiographical memory is about the self."

Neisser (1989) stresses the central role of affect in the self-concept, (see Section 1.4). He describes the 'private self' as "our own feelings and beliefs. Our ultimately private emotions which are probably beyond verbal description. The private self involves awareness that these are uniquely our own." Thus, by definition the child cannot acquire autobiographical memories before acquiring a self concept which is a gradual process (Miell 1990).

Nelson (1991) affirms that no recall of an event that involves the self is possible without recalled awareness "what I felt about it." The fact that the self must always be the experiencing ego is the basis of the prediction in the Introduction to this thesis that an affect component will be present, and probably discernible, in all autobiographical memories, and also, that in early childhood memories the prerequisite of affect will have a relatively bigger role to play because cognitive understanding is not sufficiently developed to encode the nature of the event very effectively.

The developmental changes that occur throughout childhood and which have been outlined in Sections 2.2 - 2.7 will necessarily be reflected in the nature of childhood memories from different periods. One of the aims of this thesis is to chart the qualitative changes in childhood memories across the age range.

2.8 Summary - Chapter 2

- Piaget's account of the stages of development suggests ways in which childhood memories drawn from different age periods are likely to differ.

- There is evidence that children develop scripts and schemas from an early age. These gradually begin to form an organising framework for memories.

- Social conversations shape and stabilise children's memories. Developing language skills allow memories to be represented and reconstructed flexibly.

- Childhood amnesia may be partly accounted for by failure to encode early experiences. Memory for procedural skills and general semantic aspects of the environment are more urgent for survival and so it is argued precede the development of autobiographical memory.

- Prerequisites for the development of autobiographical memory include cognitive experiential and pragmatic factors. The development of the self concept is crucial.

CHAPTER 3

METHODS

FOR STUDYING

CHILDHOOD MEMORIES

3.1 Introduction

There is wide consensus today as outlined in Section 1.4.3 that autobiographical memory is not a static filing system of discrete memories, but is dynamic in response to new experiences and to new understanding of old experiences. It follows that events encoded in childhood may well be remembered in a different light in adult years. There is, therefore, a categoric difference between the study of how children remember events and how adults recall their childhood. Extensive investigation of how children remember has been carried out by researchers such as Nelson, Hudson, Fivush, Morse, Piaget and many others. It has usually focused on the ability to remember events in relation to a child's age. The paradigms used need not concern us here, for the present research addresses the very different issue of adults remembering childhood.

Research on the recall of childhood memories relies on two methods, free recall and cued recall. Free recall has the advantage of placing no constraint whatever on what is recalled: cued recall has the advantage of allowing some measure of experimental control. Accordingly, both methods were employed in this research.

The studies here aim to provide detailed analysis of the contents and nature of childhood memories, which will form a basis for inferring what qualities make them particularly memorable. Brewer (1986), writing about autobiographical memory in general, says: "It is clear that we need much more empirical work on the basic descriptive aspects of this important form of human memory."

The present research aims to move a little closer to filling the need. To supply the "basic descriptive aspects" in Study 1 it was considered the investigative paradigm

would need to meet the following requirements. Subjects should feel no constraints upon either topic areas or contents of the specific memories they chose, recalled from within stipulated age periods - from birth to age 18. Subjects should describe the properties / attributes of each memory in a structured way that would allow appropriate comparisons to be made. Subjects should rate attributes, including positive and negative emotions felt, so that the relative strengths of different attributes could be measured. Results should be comparable by encoding age, subject age and gender. Although self ratings obviously lack objectivity, it is the subjective qualities of the memories that are important for the purposes of this research. It is quite usual for researchers (inter alia Cohen 1989, and Chaffin 1983) to ask subjects to rate various dimensions of memory such as frequency of recall, vividness, emotionality and so on, in order to correlate these with such factors as subject age, memory age, gender and age of encoding. The present research makes no apology for using self rating, for unless subjects are deliberately lying, what they say they feel is, for them, reality.

These methods offer no way of assessing the veridicality of the recalled memories. Some researchers have sought to validate childhood memories by interviewing parents but, in the present study, this procedure was not practicable due to the wide range of subjects' ages. Moreover, it was not an important issue for this research which was primarily concerned with the nature of the memories rather than their accuracy.

3.2 Methods Chosen

The research described in this thesis employed two different methodologies. Studies 1 and 3 used a form of survey research whereby childhood memories were elicited by purpose designed questionnaires and then rated for the strength of various designated qualities. Study 2 employed an experimental method whereby retrieval cues were manipulated and retrieval time was measured. The use of different methodologies to seek converging evidence is considered likely to strengthen the conclusions.

To provide the diverse range of comparable information needed to serve the aims of Study 1, the research paradigm chosen was structured free recall. Subjects were asked to recall any memory from a designated age period to provide structured information about it (see questionnaire - Appendix A). Free recall was chosen for Study 1 because its spontaneity and unrestricted choice are likely to elicit memories that are the most personally meaningful to the remembering self. The designated encoding age periods were: below 3, 3 - 5, 6~8 - 11, 12 - 14, 15- 18. These divisions were thought to be sufficient to differentiate between developmental stages, without being too many to allow subjects to respond easily.

Cued recall was used for Study 2 because the few constraints it imposes allow direct comparison between emotion and object cued memories. This provides a test of the hypothesis that emotion is related to vividness and retrievability The measure used was latency of response so that the accessibility of different kinds of memories could be compared. Subjects also rated different characteristics of the memories to enable comparison with findings in the free recall of Study 1 (Questionnaire and cue words - Appendix B).

Study 3 demanded a different approach, for it concerned forgetting; the obverse of memory. The object was to measure the annual rate of forgetting autobiographical details in relation to memory age, topic area and gender. Subjects were therefore asked to recall specified items so that the amount recalled could be assessed. The method employed was a standardised questionnaire that asked subjects to recall facts which they would have known at the time about their schooling, aged between 6 and 11. (Questionnaire - Appendix E).

Details of the methodology for each study is provided in Chapters 4, 5 and 6 and the rationale is described.

CHAPTER 4

STUDY 1

FREE RECALL BY ADULTS OF CHILDHOOD MEMORIES

4.1 Introduction

This study is primarily concerned with the attributes of memories that are recalled rather than with their topic content. The latter is, however, taken into account when it throws light on determinants of recall, particularly in relation to encoding ages.

The questions in the questionnaire shown in Appendix A were designed to elicit answers to the following questions:

How early does autobiographical memory start?

What sort of things do we mostly remember?

How well do we remember them?

How vividly do we recall the physical aspects of these events?

How important is sensory imaging?

Which senses are involved and how intensely?

How often does 'observer' imaging of the participating self occur?

How strongly did we then / do we now feel about what happened?

What emotions were then / are still aroused?

How often do we recall the particular memory?

What sort of thing triggers its recall?

And finally, how would subjects describe, in a nutshell, what each memory 'means' to them; what do they feel is its personal significance?

Previous studies have not so far provided a detailed analysis of childhood memories from across the whole age range of childhood, and have not compared the childhood memories recollected by adults of different ages. Few studies are

available that investigate relationships across the wide field of determinants using a single sample of 'ordinary' people aged between 21 - 91.

However, despite its essentially exploratory nature and survey methodology, there are several broadly based hypotheses addressed by the present research. One is the prediction that the total intensity or vividness of a childhood memory is determined not only by the vivid recall of the physical aspects of what happened (that is, by its sensory quality), but also by the intensity of what was, and possibly still is, felt about it. This prediction is based on the well established relationship between vividness and emotion found in adult memories (see Section 4.3.7).

It is predicted that:

- Despite the fact that adults are doing the remembering, qualitive changes will be found in memories of childhood that reflect the developmental changes at the age of encoding.
- That, as with adult memories, autobiographical memories of childhood will have an affective content.
- That strength of affect is related to the vividness of memories.
- That the relative importance of different determinants will vary with encoding age.

The research will examine the principal determinants that are hypothesised to be involved in the adult recall of childhood memories.

Characteristics Of The Memory Recalled

This concerns such aspects as encoding age, topic, sensory involvement (rated for intensity) and imaging (field view) and / or self imaging (observer view). In short, it is descriptive of what is recalled. Selection of the characteristics to be explored was guided by previous research.

Predominant among the characteristics observed by researchers in the past has been the prevalence and strength of visual imaging in autobiographical memories. For Ribot (1882) remembering was "A vision in time." For Brewer (1986) "Remembering is mostly imaging." Nigro and Neisser (1983) drew attention to the two different viewpoints employed in the visual imaging of autobiographical events; 'field' in which the event is imaged as it was seen at the time, that is, without seeing one's self in the picture, or alternatively 'observer' as a spectator could have seen it with the rememberer taking part. In a series of studies they found that the distribution of field and observer viewpoints was related to the dimensions; (1) emotionality and (2) self awareness. Observer memories involved more emotion at encoding. A field viewpoint was found to relate more positively to the recency of the event than to any intrinsic properties.

Topic Areas

The relative incidence of different topic areas found by previous researchers has usually been based on the recall of memories drawn from the whole, or a substantial portion of a subject's life span. This is very different from deriving the mean incidence of topics that describe events recalled from separate three-year age-spans from birth to eighteen. It is, therefore, only to be expected that findings would differ. Memory topics will vary necessarily with the life experience typical of each age period. For instance, in a study by Cohen and Faulkner (1987), it was

found that, averaged across the life-span, births, deaths and marriages topped the rating lists at 22% followed by holidays at 11.8%. This rank order of topics is clearly unlikely to be replicated in childhood memories.

Recall Factors

Other determinants operate primarily at the recall stage. These, of course, relate to the memory recalled, but even more directly to aspects of recalling it. They should, therefore, offer promising ground for seeking determinants of recall. Among aspects included here, are clarity and vividness, contextual coherence or isolation, confidence in correct recall, emotional arousal (rated as at the time of the event and at recall), frequency of recall, extent of rehearsal and external reminders, cueing the particular memory, its personal meaning The rationale for including these determinants in the study is discussed below.

Vividness has usually characterised the recall of memories that are easily accessed. At the extreme of vividness are Flashbulb memories. Brown and Kullik (1977) found the main constituents to be emotionality, surprise, importance or consequentiality or unusualness. The presence of the same qualities was confirmed by Rubin and Kozin (1984). They asked students to rate three recent experiences for personal importance, vividness, surprise and emotionality, and for how often the event had been rehearsed in discussion. The most common topics were sports, accidents, injuries and meetings with the opposite sex. The most vivid memories also received the highest ratings for surprise, personal importance and emotionality.

Memories within the present research are not described as 'Flashbulb', yet within all encoding age periods vividness is frequently described at the highest level: "I see and re-experience it again" (question 8).

A link between emotionality, accessibility and vivid recall has been confirmed in studies by many researchers (Cohen and Faulkner 1987, Robinson 1980, Bartlett 1932, Conway 1990, etc.). Robinson investigated whether it is the intensity or the quality of the emotion, for example pleasure, that determines the speed of access to a memory. In three studies which involved self rating of memories for intensity and positive / negative emotionality, Robinson found intensity was a good predictor of recall; the nature of the emotion was irrelevant.

Pillemer et al (1988) asked three groups of college alumnae to recall four memories of their first year at college, after time lapses of two, twelve and twenty-four years. In all three groups the modal type of memory was of a first-time, emotionally powerful personal event, which was considered at the time to have life importance.

Confidence

In real life, people, for the most part, seldom question whether what they remember is a true record. Confidence levels are invariably very high. Yet tests of genuine diary entries against foils show that such confidence is sometimes misplaced. Barclay and Wellman (1986) show this in a series of diary entry recognition tests. Barclay suggests generic merging over time as a possible cause. Outside of controlled experiments, it is often impossible to check the truth of recall, especially for events of a personal nature distant in time and place. Such difficulties preclude the checking of the childhood memories in the present

research. No doubt there are inaccuracies. But, arguably, this need not matter. Determinants relate to what the subjects thought they actually remembered - not what they might otherwise have more accurately recalled.

Island Memories

Memories of infancy have sometimes been described as 'island memories' because they are not recognisably related to the continuum of life experience. It was noted in Section 1.5 that children are unlikely to have organised their autobiographical memories into the life periods and temporal sequences of Barsalou's model. To investigate the question of contextual isolation, subjects in Study 1 were asked whether they could remember what was happening immediately before and after events encoded (a) in early childhood and (b) in later childhood. No control list of adult-encoded memories was thought necessary, since the description 'island memories' seldom applies to teenage or adult recollection.

Rehearsal and External Reminders

There is an interesting paradox between the effects of repetition on experience and repeating a memory. It has commonly been found that uniqueness, implying the total absence of repetition of the event or experience, is a powerful aid to the accessibility of a memory. Yet it has also been found, often in different studies by the same researchers, that repeated rehearsal of the memory also acts powerfully as an aid to recall. (Conway 1990, Cohen and Faulkner 1987, Rubin et al 1986, Brown and Kullik 1977, Bohannon 1988, etc.).

A suggested answer to the conundrum is that, in the first case it is the intensity of emotion (surprise or whatever) aroused at encoding that makes the event so memorable, while in the process of recall it is reminder cues that index the memory

and that rehearsal 'shows the way' by linking the milestones of the memory (what Ribot 1882, has called reference points).

The questions of frequency of rehearsal and the nature of external reminders is addressed in Study 1, as well as subjects' beliefs about whether their memories are influenced by such extraneous factors.

Cueing

In Section 1.5 it was noted that cueing provides valuable insight into the organisation of autobiographical memories. In Study 1 the only cues supplied were the designated age periods from which memories had to be recalled. However, subjects were asked to say what kind of cues usually triggered the memories. For convenience, subjects' descriptions of cue types relating to particular memories have been collapsed into four categories: *perceptual* that is, sensory input: sight, hearing, smell, taste, touch, heat or cold, pain; *action* that is, something the subject or someone else does; *emotional* that is, recognition of a particular feeling belonging to this event; *verbal* - arising from a spoken train of thought, either silently alone, or in conversation with others.

Emotionality

Few, if any, researchers into autobiographical memory have not found emotionality to be an important constituent quality. An example of empirical work supporting the link is provided in a study by Conway (1989). Subjects were asked to generate memories in response to three different types of word cues: (1) emotion, (2) taxonomic, for example, furniture, (3) groups of people, for example, school teachers. Memories were categorised as either autobiographical, generic or semantic. Emotion cues were most effective in evoking autobiographical memories.

Research has also shown that experiencing congruent emotions can evoke recall of past experiences in which these emotions were strongly felt. (Teasdale and Fogarty, 1979; Snyder and White, 1982; Gilligan and Bower, 1984). Typically it was found that if a depressed happy or neutral mood is induced in a subject, then in free recall more corresponding events will come to mind.

Some researchers have awarded primacy to emotionality in the determination of recall. (e.g. Bartlett, 1932; Piaget, 1954; Robinson, 1980; Nelson; 1983, 1991). The present writer's hypothesis that an affect content is included in every personal memory is based on the view that its presence is necessary if autobiographical memory is to serve its hypothesised adaptive purpose.

Growing interest within cognitive psychology in the nature of 'self', and its inseparable link with affect, makes it likely that many today will agree with the above view. But to be meaningful, such a prediction calls for some way of demonstrating a balance between recall of the objective facts of 'what happened'

and the affect evoked, which combined form the memory of the autobiographical experience. This is an issue left unresolved by previous research.

In Study 1 it is considered possible to separate these elements because the same subjects provide separate ratings within each of their recalls concerning:

(1) Overall intensity of realism that combines clarity, vividness and affect.

(2) A rating for the intensity of sensory imaging of the physical aspects of the event.

(3) Separate ratings for affect, or what they felt/still feel about it.

Personal Meaning

As with emotionality, personal meaning features increasingly in the list of factors ascribed by researchers to autobiographical memory. This is in step with drawing attention to the role of experiencing and evaluating 'self'.

Little or no formal research has been possible on personal meaning, for it is not something that can respond to manipulated variables in the laboratory, or even be reliably inferred from real life. Indeed it is difficult to define, although subjectively clear to the experiencer. Moreover, the term itself is likely to mean something different for the rememberer, according to the life period of encoding. During active years, personal meaning will often be related to goal orientation and will imply action of some kind. With childhood memories, all that probably belongs to the irretrievable past. This certainly applies to most of the subject sample in the present research. Consequently, for them, personal meaning probably involves no action, and is likely to be more a matter of how they feel about the event when

they recall it. Appropriately, personal meaning is the final question to be asked in Study 1, for the answer sums up the present holistic impact of each memory.

Thus, Study 1 investigates the extent to which memories of childhood events retain the various senses involved in the event and are mentally imaged at recall, and also how strongly various emotions were, and still are, evoked by what happened.

It is hypothesised that results will show the presence of both sensory imaging and persistent affect as joint determinants of recall. Such a finding would also support the hypothesis that autobiographical memory is an adaptive tool, since, in the living generation, the essential attribute of learning from experience depends on remembering what happened in the past.

In accordance with the indications derived from the previous research outlined above, this study examined the following memory attributes: topic, clarity, sensory quality, vividness, context, emotionality, frequency of recall, origin, cue type and personal meaning. Three variables were investigated in relation to these attributes: age of encoding, subject age and gender. Memory qualities are likely to change with age of encoding (see Chapter 2) as the child's abilities, interests and activities change. They are also likely to change to some extent with subject age due to forgetting over time and the effects of ageing on memory. However, frequent recall and personal importance may preserve selected memories. (Cohen & Faulkner, 1988). Gender may affect the kind of topics that are remembered and women have been found to have earlier childhood memories than men (Usher & Neisser, 1993).

4.2 Method

4.2.1 Subjects

109 adults, 53 men and 56 women. Ages ranged between 21 and 91. Median age 53, with 54 older and 54 younger. Subjects had no academic or other special interest in the area of research.

They were selected randomly from local electoral registers. The initial approach was by letter, inviting them to participate in a university based study concerning childhood memories and saying that the writer (personal references provided) would 'phone in a couple of days, hoping they could then arrange a convenient time either at the writer's address or at their own. No details were given which might bias the results. No remuneration was offered.

The positive response rate was slightly above 75%. All but 5 out of the 109 subjects chose to come to the researcher's house.

Sampling Procedure

Every Nth name from the electoral register covering streets located conveniently near the researcher's address.

Sampling Area

London SW13. Few of the subjects were born and brought up in their present location. Their childhood memories ranged over a geographical scatter within the British Isles and overseas to an extent that makes regional bias unlikely.

AGE BREAKDOWN OF SAMPLE

Age Group	No. of subjects
20–29	11
30–39	7
40–49	30
50–59	23
60–69	18
70–79	15
80–89	3
90–91	2

4.2.2 Materials

Questionnaires with space for verbal answers to be recorded by the researcher were constructed. The pro-forma questionnaire at appendix A will show that a very wide net is cast inviting subjects to provide free recall examples of childhood memories that illustrate topic and other differences across encoding ages from birth to adolescence. The questionnaire elicits the incidence and strength of a subject's exogenous senses used in imaging, and similarly to what extent various emotions play a part in the recall. Finally it provides an opportunity for subjects to identify, in a nutshell, the personal meaning of each memory recalled. This data provides the basis for testing the previously stated hypotheses.

4.2.3 Procedure

Although no attempt could be made to aid recall by replicating encoding environment, care was taken at least to minimise incongruity by avoiding a laboratory atmosphere. Subjects were encouraged to 'feel at home', with a cup of tea or coffee beside them, seated in an armchair in the researcher's study, facing a window with a view of sky and trees. They were not subjected to any time

pressure. A relaxed atmosphere was considered important, since experience has shown it helps reminiscence.

A structured interview was employed, using spoken questions standardised as on the questionnaire (see Appendix A). Free recall was requested of one event from each of 6 three-year age spans, from birth to age 18.

Subjects were reassured about confidentiality and were asked, if possible, to recall a specific discrete event or happening, rather than merely some remembered environmental feature or general event. Those who, despite trying briefly, could not recall an event within the required age span were told not to worry, and to proceed to the next 3-year span. Thus, the 633 memories recalled fell short of the 654 that would have resulted, had each of the 109 subjects produced 6 memories. The shortfall relates almost entirely to events before age three.

For the sake of speed and legibility, answers were spoken and the researcher filled in the questionnaire. Each memory, as briefly written up, was read aloud to the subject for confirmation, and was then followed by a battery of standardised questions relating to aspects of the recall process and to the affect experienced. Subjects were not informed beforehand what form the research would take, so they were not able, in advance, to choose and rehearse 'suitable' memories.

Encoding Age Spans

The six age spans from each of which subjects were sequentially invited to recall a memory were:

Before age 3

3 but less than 6

6 but less than 9

9 but less than 12

12 but less than 15

15 to 18 inclusive.

Note: That whereas the first five are in 3 year spans, the sixth is extended to 4 years to include memories at age 18. This is to provide equal opportunity for both early and later school leavers to recall job interviews or first job experiences; a popular choice on leaving school. Statistically, this imbalance is immaterial since the present research does not concern quantitative recall within age periods, other than incidence at the earliest period.

4.3 Results

Some of the results are being presented as purely descriptive statistics, simply to enrich understanding of the nature of childhood memories. Others, i.e. those that relate to hypotheses are analysed appropriately.

4.3.1 Recall Of Events Before The Age Of Three

How Young Can We Remember? Out of the total sample of 109 subjects, 90, i.e. 83% were able to recall an autobiographical event before the age of three.

Of the 19, i.e. 17% who could not do so, 11 were men and 8 women. After the age of six, all except, one subject, i.e. 99% were able to recall an event within each 3-year age span between 6–18 inclusive. The one subject who failed was a woman who could recall no particular event between the ages of 6–9. However, as she had, without difficulty, already produced memories from both of the younger age slots, her failure cannot be ascribed to 'childhood amnesia'. Her own explanation was: "Life was on such an even keel at that time." After age nine there were no blanks.

4.3.2 Incidence Of Memory Topics

Memories were classified according to topic and the percentage of memories of each topic were calculated and are shown in Table 4.3.2.1. Separate percentages were also calculated for each age band and are shown in Table 4.3.2.2. To enable comparison 19 of the categories used here are those previously researched in relation to a broader spectrum of adult memories. (Cohen and Faulkner 1987).

A 20th category, especially applicable to children, has been added, namely Adventure – deliberately sought. Memories were classified into topic areas independently by three judges. Where an event overlapped into two or more categories it was encoded into its main category as agreed by the judges in discussion. It was not found appropriate to sub-categorise events as first time, last time, unique or repeated. Reliable distinction was too often impossible, since so many early childhood memories centre on some activity or aspect of a common situation which was, nonetheless, new to the young rememberer, and so may well have been first time or unique.

The relative incidence of different memory topics varied across the age bands. However, the significance of these variations was not analysed statistically. Not surprisingly, early memories concentrate within a narrower orbit of activities than those of later years. Table 4.3.2.1 shows that nearly half the memories up to age of 18 lie within only four categories: School, Trivia, Ill-health and Family happenings, in that order. The high incidence of Trivia recalled from early age periods is discussed later. The four categories alone account for 49%, to which should probably be added a good deal from: Birthdays, Anniversaries, etc. since these are also mostly within the family.

School and Education

Despite the frequently reported strong impression made by first days at nursery, pre-prep. and prep. schools, and later, at schools, colleges and universities, more than half (52%) of all schooling memories are encoded between the age of 9 and 14 (see Table 4.3.2.2).

Trivia

These are happenings which would probably be classed by adult standards as too insignificant to class as events. For example: "I remember being in a railway carriage accompanied by my nanny while my parents were in another compartment" (age under 3); "I was watching knights jousting at the Leicester pageant when I was seized with an urgent need to pee. A teacher took me behind the bandstand" (age 6–9); "I remember pushing my own dark green push-chair on a cold winter's day while wearing a white coat with a hood" (age under 3). As can be seen in Table 4.3.2.2, the Trivia category is steeply biased towards younger encoding age. This may well reflect adult inability to recognise something within a memory which may have been far from trivial to the child at the time. Subjects' vividness and emotionality rating of Trivia memories often support this view.

Ill Health

From Fig. 4.3.2.2, it will be seen that recall of Health, Accidents and Hospital relating to the entire family household, covered by this category, plunges steeply from a mean of over 20% for other encoding ages to only 2% for the 15–18 period. This could be partly due to the fact that by this age the usual children's illnesses are over. Table 4.3.2.2 shows that nearly two-thirds of Ill-health recall (65%) relates to before age 15. On the other hand, adult afflictions have not yet begun. It is also possible that teenage problems, and a desire for independence leave less room for concern about the health of the rest of the family.

Family Events

Family centred memories are twice as frequent in the younger encoding age periods. The period from birth to 8 accounts for two-thirds of them, while from 9 to 18 has only one third (see Table 4.3.2.2). It is perhaps not surprising that 15%

of memories within the youngest age span, before age 3, are family centred. Less clear is why the percentage drops to its lowest, 4%, between ages 12 and 14, before picking up again to 11% at 15–18. This variation may not be statistically significant. Alternatively it may reflect physical and attitudinal changes at the onset of puberty, as sometimes reported by developmental psychologists. (Inhelder and Piaget 1958, Flavell 1963, Beard 1969, Meadows 1983).

Adventure

An early adaptive urge to explore is reflected in the finding that 10% of adventure recall is in the under 3 age span. Between 3 and 11 the percentage rises steadily, probably in step with the physical development needed to broaden adventurous possibilities. Diminution after age 12 may indicate the onset of other interests.

War and National Service

Recall of War/National service chiefly depends upon when and where the subject's childhood happened to be. Its rank order should not, therefore, be generalised beyond the present sample.

Achievements

The recall of achievements is inevitably linked with the development of accomplishments. Consequently, it increases with the subject's age of encoding until the early teens, especially as achievement is often linked to organised sports.

Active, Passive Participation

This was classified by the same three judges who categorised events into topic areas. It is not always easy to draw a clear distinction between active and passive participation, since in both cases the subject is personally involved. The most

frequently used criterion was initiation of the reported activity. Was it activated by the subject, or was it something that happened to the rememberer or was observed by him? Such a dividing line would seem to put such a topic as (14) Spectacles, theatre, cinema in the passive category. Yet if, as in one case, the memory was leaving the grandstand during the show in order to do a wee behind the stand, it would be classified as active. Fortunately, after discussion of such ambiguities, there was no dissension among the judges. The percentages of memories judged to be active in each category are shown in Table 4.3.2.1.

Table 4.3.2.1. suggests that memorability is unrelated to the extent to which participation in the event was 'active' or 'passive'. Three out of the four most frequently recalled categories are among the lowest in 'active' participation. The absence of relationship is further illustrated by the two categories jointly ranked 12th in order. Both have 3.5% share of the total, yet are as different as 86 and 64 respectively in active participation. Statistical correlation between categoric incidence and active relationship is only .08. It seems that personal involvement, which is at the core of autobiographical remembering, depends more on what occurred than on who did what.

Table 4.3.2.1 Rank Order Of Categories Of Events Remembered

		No. of mems	% of total	% Active
1	School	118	18.6	64
2	Trivia	74	11.7	47
3	Illness. injury. hospital	64	10.1	58
4	Family & family occasions	54	8.5	52
5	Adventure (deliberately sought)	40	6.3	100
6	War and/or National Service	38	6.0	55
7	Achievement. exams. prizes etc.	36	5.7	94
8	Holidays	28	4.4	68
8	Births. deaths. marriages	28	4.4	54
10	Work. jobs. careers	27	4.3	74
11	Sport	23	3.6	74
12	Friends & social occasions	22	3.5	86
12	Love. romance. sex	22	3.5	64
14	Spectacles. theatre. cinema etc.	18	2.8	78
15	Home. moving. furnishing etc.	11	1.7	54
16	Religious events. confirmations	8	1.3	63
17	Catastrophes. fires. accidents	7	1.1	28
17	Pets	7	1.1	57
19	Birthdays. anniversaries etc.	6	1.0	50
20	V.I.P.s meeting famous people	2	0.3	50
	Total	633		

Table 4.3.2.2 Difference In Topic Incidence By Age Of Encoding

Only those accounting for 5% or more of the total are shown. Topic percentages show how much of the total recall within each age period is devoted to each of the categories.

TOPIC	ENCODING AGE						TOTAL
	< 3 n = 90	3–5 n = 108	6–8 n = 108	9–11 n = 109	12–14 n = 109	15–18 n = 109	n = 633
School	3 (3%)	20 (17%)	18 (15%)	30 (25%)	32 (27%)	15 (13%)	118 (19%)
Trivia	45 (61%)	20 (27%)	5 (7%)	3 (4%)	0 (0%)	1 (1%)	74 (12%)
Ill health	11 (17%)	16 (25%)	15 (23%)	10 (16%)	11 (17%)	1 (2%)	64 (10%)
Family events	8 (15%)	14 (26%)	14 (26%)	10 (19%)	2 (4%)	6 (11%)	54 (9%)
Adventure	4 (10%)	7 (18%)	8 (20%)	10 (25%)	5 (13%)	6 (15%)	40 (6%)
War/Nat. service	3 (8%)	6 (16%)	8 (21%)	9 (24%)	4 (11%)	8 (21%)	38 (6%)
Achievements	2 (6%)	2 (6%)	6 (17%)	5 (14%)	9 (25%)	12 (23%)	36 (6%)
TOTALS	76	85	74	77	63	49	424

Note: Nearly half the memories lie within four categories: School, Trivia, Ill Health and Family Happenings in that order.

Differences In Topic Incidence By Gender

Women are more likely to recall schooling, family-centred events, childhood achievements, and to some extent, matters of health (see Table 4.3.2.3) Men recall considerably more childhood adventures, and also more trivia, i.e. items or experiences of personal, childish interest that others would probably consider too trivial to be recognised as events. The incidence of 'War/National Service' memories depends chiefly on when and where subjects happened to be during their childhood and 'teens, so cannot be taken as representative beyond the present sample.

Table 4.3.2.3 Differences In Topic Incidence By Gender

(Only topics accounting for 5% or more of the total are shown)

TOPIC	no. of mems.	% all mems.	No. Male	No. Female	% Male	% Female	Difference in %
School	118	18.6	51	67	43	57	14 more F
Trivia	74	11.7	42	32	57	43	14 more M
Ill health	64	10.1	31	33	48	52	4 more F
Family events	54	8.5	21	33	39	61	22 more F
Adventure	40	6.3	25	15	62.5	37.5	25 more M
War/Nat. Service	38	6.0	28	10	74	26	48 more M
Achievements	36	5.7	17	19	47	53	6 more F

Differences In Topic Incidence By Subject Age

The incidence of memory topics recalled by subjects of different ages is shown in Table 4.3.2.4 and the way that topic incidence varies with subject age is graphically illustrated in Fig 4.3.2.1

Out of the four categories most frequently recalled, which between them account for some 50% of all topics categorised, the incidence of Trivia and of Illness is relatively unaffected by the age of the rememberer (see Table 4.3.2.4) This is markedly not so with some other topics. The shifts are not statistically analysed because the numbers are too small. However, some of the major shifts are interesting. For instance, the steep plunge in old age in the recall of School events. Later, in Study 3, it will be found that very old people can remember their schooling surprisingly well if asked to do so. The fact that they do not do so in free recall must therefore reflect choice rather than ability. In other words, school events are not a topic that comes readily to mind in advanced old age. Conversely, Family often plays an increasingly important part for the very old, and here Table 4.3.2.4 shows a sharp upsurge in the recall of family topics. It would seem that the incidence of topic recall may in part depend on the amount of personal interest or involvement in the topic felt at the time of recall which, in turn, may reflect an age-related change in the *function* of reminiscence.

Also, predictably perhaps, the category of Work, Jobs, Careers is less accessible during the active years of actually 'getting on with it' than after retirement. Remembering concerns the past – at around 70 in this topic area it almost doubles, suggesting the onset of the age of increased reminiscence in retirement.

The category 'Friends, Social Occasions' shows a pronounced peak among people in their thirties. This might be because, for many, these are socially very active years, involving not only personal friends, but also children's school friends and parents, children's parties, etc. Though the events being recalled here are not contemporary with the 30s-decade, but are of childhood, it could be conjectured that subjects' minds in this age group are more than usually attuned to the topic

area. Recall within the category 'Love, Romance, Sex' is understandably low in childhood experiences, which mostly occurred before puberty. It stays between 5% and 2% in all age groups, from the twenties into the nineties!

Table 4.3.2.4 Categories Of Events Remembered - By Age Of Subjects At Recall

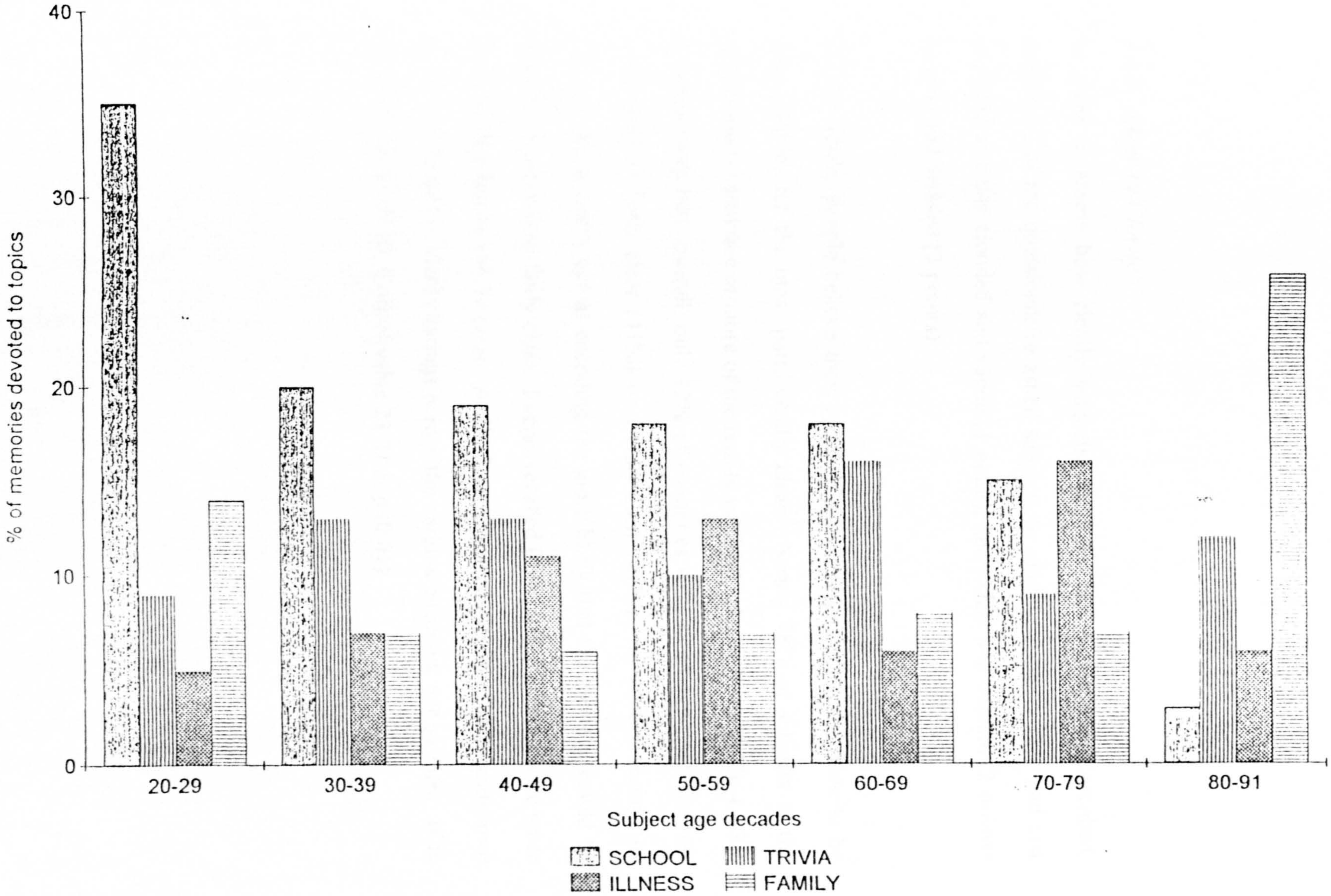
Percentages show how much of the total recall within each age group is devoted to each of the categories.

AGE GROUPS	20-29	30-39	40-49	50-59	60-69	70-79	80-91	Total by ctgs
School. college. etc.	20 35%	9 20%	34 19%	24 18%	18 18%	12 15%	1 3%	118
Trivia	5 9%	6 13%	23 13%	13 10%	16 16%	7 9%	4 12%	74
Illness. injury. hospital	3 5%	3 7%	20 11%	17 13%	6 6%	13 16%	2 6%	64
Family & family occasions	8 14%	3 7%	11 6%	9 7%	8 8%	6 7%	9 26%	54
Adventures (voluntary)	2 4%	4 9%	13 7%	8 6%	7 7%	3 3%	3 3%	40
War or National Service	0 0%	0 0%	7 4%	10 14%	3 3%	6 7%	3 9%	38
Achievements. exam etc.	3 5%	3 7%	12 7%	10 7%	3 3%	3 4%	2 6%	36
Holidays	3 5%	4 9%	10 6%	7 5%	2 2%	2 2%	0 0%	28
Births. deaths. marriages	4 7%	2 4%	8 4%	4 3%	4 4%	4 5%	2 6%	28
Work. jobs. careers	0 0%	2 4%	3 2%	5 4%	6 6%	8 10%	3 9%	27
Sport. hobbies	2 4%	1 2%	5 3%	4 3%	6 6%	4 5%	1 3%	23
Friends. social occasions	0 0%	6 13%	6 3%	3 2%	3 3%	4 5%	0 0%	22
Love. romance. sex	3 5%	2 4%	8 4%	4 3%	2 2%	2 2%	1 3%	22
Spectacles. theatre. films	2 4%	1 2%	9 5%	2 2%	3 3%	0 0%	1 3%	18
Home. moving. furnishing	1 2%	0 0%	3 2%	2 2%	3 3%	2 2%	0 0%	11

Religious events	1 2%	0 0%	4 2%	0 0%	1 1%	2 2%	0 0%	8
Catastrophes. accidents. etc.	0 0%	0 0%	2 2%	1 1%	2 2%	2 2%	0 0%	7
Pets	0 0%	0 0%	1 1%	2 2%	3 3%	1 1%	0 0%	7
Celebrations. birthdays. etc.	0 0%	0 0%	1 1%	1 1%	2 2%	1 1%	1 3%	6
VIPs. meeting famous people	0 0%	0 0%	1 1%	0 0%	0 0%	0 0%	1 1%	2
TOTALS BY SUBJECT AGE	57	46	181	135	98	82	34	633
No. of Subjects in AGE GROUP	11	7	30	23	18	15	5	109
Mean recalls per AGE GROUP	5.2	6.6	6.0	5.9	5.4	5.5	6.8	

Fig. 4.3.2.1

Effect of subject age on recall topics



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4.3.3 Memory Clarity

In order to assess how clearly subjects remember the events they described, question 2 of the questionnaire asked subjects to rate the memory they had just provided as either clouded and vague (1 point), fairly clear and definite (2 points) or vivid and detailed (3 points).

On the whole, people believe their recall of events after the age of three to be clear, indeed, for the most part, vividly clear. Nearly 78% of subjects in the present study rated one or more of the recalls as 'vividly clear'. From Table 4.3.3.1 it will be seen that, overall, only 12% of memories were rated as vague; the rest were rated as fairly clear (41%) or vividly clear (47%). In general terms, the younger the subject's age at encoding the more likely that the memory would be rated as vague or only fairly clear. Events recalled from later childhood were more likely to be rated as vividly clear. A Chi Square analysis confirms the significance of the differences in clarity ratings across the various encoding age groups. (Chi Square = 40.75, df 10, Critical value 23.21 at $p<0.01$).

Table 4.3.3.1 Differences In Clarity By Age Of Encoding

(Clarity ratings by subjects expressed as percentages).

ENC. AGE	<3 %	3–5 %	6–8 %	9–11 %	12–14 %	15–18 %	Mean %
Vague	24	14	8	8	9	8	12
Fairly clear	50	44	40	45	42	28	41
Vividly clear	26	42	52	47	49	64	47
Totals	100	100	100	100	100	100	100

The differences in clarity ratings reveal an upward change in clarity between the ages of 3 and 7. This is consistent with a developmental view held by many authorities - from the early Jesuits to Piaget and his followers (Inhelder and Piaget 1973). However, a chi square test of the data shown in Table 4.3.3.2 yielded chi squared = 4.54, df 2, p> 10, so the clarity shift specifically at around age 7 is not significant.

Another increase in clarity seems apparent at the onset of puberty and teenage. Bearing in mind that recall here is by mature adults, with a median age of 53, one must assume that any boost to the clarity of remembering events in childhood 'watershed' years reflects changes at those times to new and more intense awareness of experience.

Table 4.3.3.2 The Mean Percentages Of Memories Encoded Before And After Age Seven Receiving Each Clarity Rating.

Clarity Rating	Encoding Age Before 7	Encoding Age After 7
Vague	15	8
Fairly Clear	45	38
Vividly Clear	40	53

Differences In Clarity By Gender

Overall, Table 4.3.3.3 shows that men rate childhood memories as 'Vividly Clear' 8.7% more often than women. But this mean figure masks important differences within the categories chosen by subjects to describe the clarity of what they remember. While the category 'Fairly Clear' is much the same for both sexes, there is a noticeable bias towards the choice of "Vague" by women. To what extent this represents objective reality, as distinct from typical, subjective male/female attitudes is beyond the scope of the present research. It is possible that men may be more reluctant than women to admit vagueness, even to themselves. The gender difference in clarity was significant by $X^2 = 17.5$, df 2, $p < .01$.

Table 4.3.3.3 Differences In Clarity By Gender

	Male Number	%	Female Number	%	Difference %
Vague	19	6.17	54	16.56	10.40 > F
Fairly Clear	131	42.53	133	40.80	1.73 > M
Vividly Clear	158	51.30	139	42.64	8.66 > M
	308	100.00	326	100.00	

Difference In Clarity Of Happy And Unhappy Memories By Gender

The classification of Happy / Unhappy memories is based on subjects' ratings on a 5-point scale of emotions they felt at the time of the event, as reported in response to question 12 of the questionnaire. The category 'Happy' includes ratings for; happiness, excitement, surprise and possibly 'other'. 'Unhappy' includes ratings for; unhappiness, fear, disappointment, anger, frustration, grief, jealousy, anxiety and possibly 'other'.

Both men and women remembered more unhappy than happy events. Among the 53 men in the sample, five, while categorising levels of clarity, were unable to categorise some of their memories as either happy or unhappy. These uncategorised memories are, therefore, omitted from Table 4.3.3.4 leaving 625 instead of the total 633 memories actually recalled.

Table 4.3.3.4 Difference In Clarity Of Happy Unhappy Memories By Gender

	Male				Female			
	Happy Incidence	%	Unhappy Incidence	%	Happy Incidence	%	Unhappy Incidence	%
Vague	7	5	11	7	29	18	25	15
Fairly Clear	64	47	62	39	64	41	73	43
Very Clear	66	48	87	54	65	41	72	42
	137	100	160	100	158	100	170	100
% Happy/) Unhappy) by gender)	46%		54%		48%		52%	

Although these data were not formally analysed, it is apparent that, for both sexes, unhappy memories received slightly higher clarity ratings.

Differences In Clarity By Subject Age

These are shown in Table 4.3.3.5. The higher clarity rating in the youngest subject age group may owe something to recency effect rather than relate purely to subject age. However, the general uniformity of means across age spans suggest that clarity of recall is not usually affected by a person's age. Interestingly it would appear that the clarity of memory 'in the mind's eye' is unaffected by age-related changes in sensory acuity which generally diminishes with age.

Table 4.3.3.5 Differences In Clarity By Subject Age

(Rating Scale: Vague = 1 Fairly Clear = 2 Vividly Clear = 3)

Age	20-29	30-39	40-49	50-59	60-69	70-79	80-91
No. of Mems	57	46	181	135	98	82	34
Total Rating	158	95	425	318	232	189	77
Mean	2.8	2.1	2.4	2.4	2.4	2.3	2.3

4.3.4 Incidence Of Sensory Qualities In Memories

In the questionnaire, questions 3, 4 and 5 queried the involvement of different senses in the memories recalled, and question 7 asked subjects to rate the vividness of each sense. The incidence and nature of visual imaging for each memory was probed in question 3 of the questionnaire.

Differences In Incidence Of Sensory Qualities By Age Of Encoding

Early sensory development is an adaptive advantage. Consequently, most of our senses are fully developed by the time autobiographical memory starts. Their respective involvement will, therefore, depend on the nature of the event rather than on developmental readiness, and their use of the senses in imaging will relate to their relevance to the meaning of what is being remembered.

Thus, because practically every personal experience involves seeing something, sight scores 99% involvement. On the other hand, such senses as Taste, Heat, Cold and Pain, are not so often relevant, and so occupy the lower end of Table 4.3.4.1. Touch and smell occupy mid positions.

Since the relevance of sensory qualities to an experience is unlikely to change with age, the involvement for each sense should not be greatly affected by encoding age. Table 4.3.4.1 shows that the involvement of senses is fairly consistent across encoding age periods. There is, however, a notable exception - Sound.

Table 4.3.4.1 shows a steep and steady increase in Sound involvement over the years. This is graphically illustrated in Fig 4.3.4.1. This need not mean that sound is biologically different from our other senses. A probable explanation is that the sound involved here is not simply a sensing of noises, but predominantly the use and understanding of the spoken word. A strong learning element in the development of linguistic skill and understanding would be expected to show an increase in the meaningful involvement of Sound in step with growing maturity.

There is some indication in Table 4.3.4.1 that the incidence of Sound in memories changes at around the age of 7.

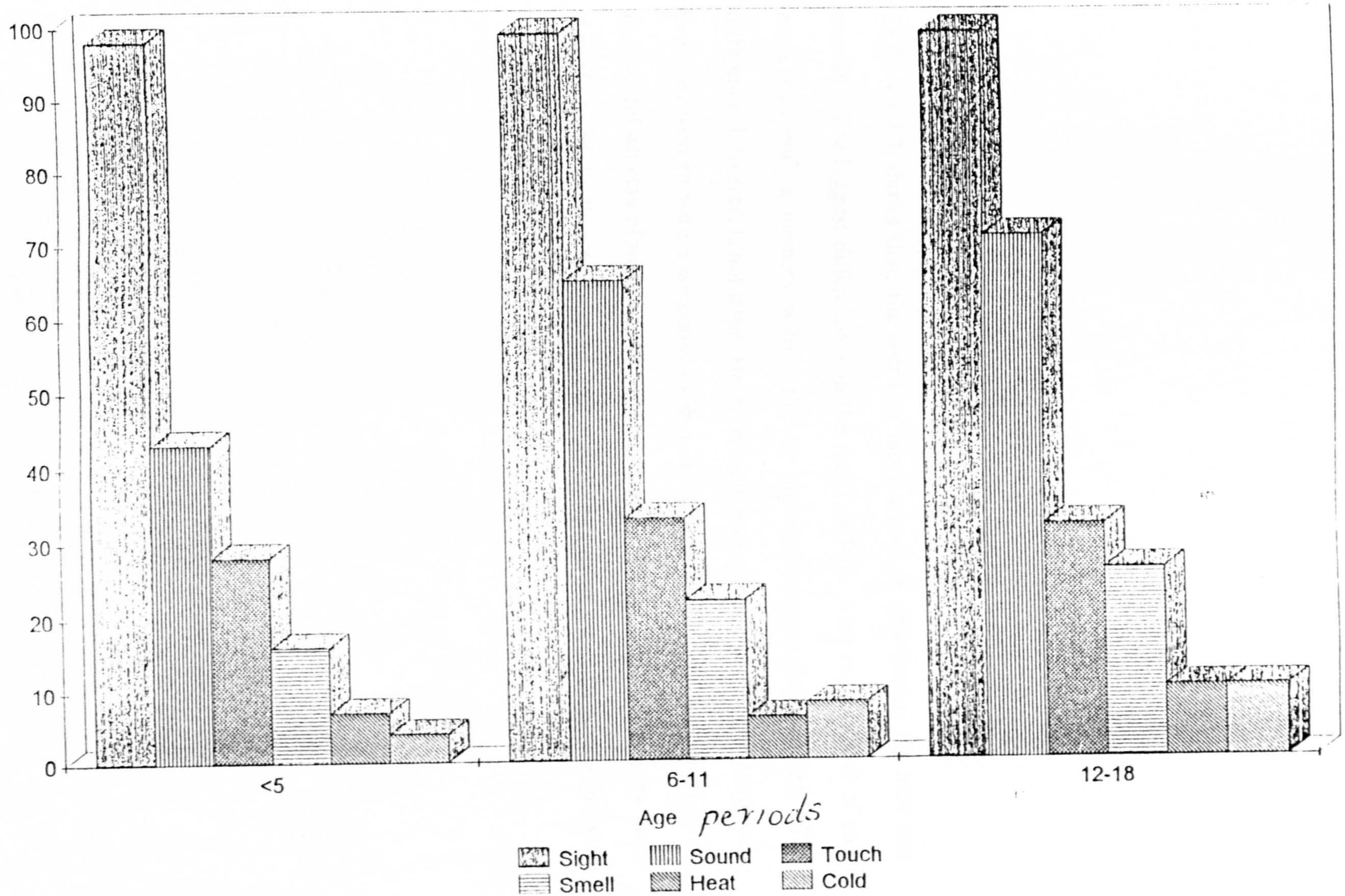
Table 4.3.4.1 Incidence Of Sensory Qualities By Age Of Encoding

Note: As the number of memories is not the same in all age groups, the involvement of each of the senses is shown as a percentage of the actual number of recalls in each age group.

Age	<5 n=198	6-11 n=217	12-18 n=218	0-18 n=633
	%	%	%	%
Sight	98	99	99	99
Sound	43	65	71	59
Touch	28	33	32	31
Smell	16	22	26	22
Heat	7	6	10	8
Cold	4	8	10	7
Taste	3	9	4	5
Pain	5	4	6	5
Mean no. of senses	2.04	2.46	2.57	2.37

Fig. 4.3.4.1

Incidence of senses in imaging memories



Differences In Incidence Of Sensory Qualities By Gender

Table 4.3.4.2 shows that, the recall of most senses is very similar for men and women. The biggest difference is in the recall of Pain. Men report recall of pain associated with a memory with a slightly higher frequency than women. The difference, however, is not large. Here, one might conjecture that nature adaptively provides women with a welcome attribute to reduce recall and avoid dwelling on the painful aspects of menstruation and child-birth. This would clearly apply more directly to adults than to children. But the ability not to dwell on pain might well extend to adult recall of childhood memories.

Table 4.3.4.2 Differences In Incidence Of Sensory Qualities By Gender

Means represent the number of memories (out of 6) in which a sense was involved.

		MEN n=53 Means	WOMEN n=56 Means
SIGHT		5.6	5.7
SOUND	own voice	1.1	1.1
	other voices	3.1	3.2
	other sounds	1.9	1.9
TOUCH		2.0	1.9
SMELL		1.3	1.2
TASTE		0.4	0.3
HEAT		0.5	0.7
COLD		0.6	0.4
PAIN		0.5	0.2

Differences In Incidence Of Sensory Qualities By Subject Age

Table 4.3.4.3 shows that seeing 'in the mind's eye' is scarcely affected by growing old. Imaging sound, however, does suffer some decline, and this is particularly so in imaging one's own voice. People in their twenties are more than two and a half times more likely to hear their own voice in a memory than subjects in their eighties. However, the sub-sample size at 80+ is too small for statistical reliability.

Table 4.3.4.3 Mean Number Of Memories (Out Of 6) In Which Each Sense Was Involved By Subject Age

	20-39 n=18	40-59 n=53	60-79 n=33	80-91 n=5	Age Trend
Sight	5.7	5.6	5.6	5.8	Little change
Sound	2.25	2.0	2.0	1.4	Decline after 80
Smell	0.85	1.4	1.2	1.2	Little change
Taste	0.2	0.3	0.4	0.2	Little change
Touch	1.9	2.2	1.8	1.2	Decline after 80
Cold	0.5	0.7	0.3	0.2	Decline after 80
Heat	0.8	0.6	0.5	0.0	Decline after 80
Pain	0.4	0.4	0.3	0.4	Little change

Visual Imagery In Memories

This was investigated in question 3 of the questionnaire, which asked subjects: "Do you picture the event in your mind's eye? If so, in colour or black and white; Still like a snap or moving like a film? Do you see yourself in the picture as though looking at the scene from the outside, or do you see it through your own eyes as when it happened, without seeing yourself? Of the 633 autobiographical memories in the present research, 620 (98%) involved visual imaging The recall of events in the mind's eye can of course vary in vividness as can imaging in all the senses. However it can be seen from Table 4.3.5.1. that subjects rated the vividness of the visual quality of their memories far more highly than the vividness of any other sensory qualities. There can be little doubt as to the paramountcy of vision in the remembering process.

Colour

Most people recall in colour. Out of the 620 memories visually imaged, 498 (80%) were in colour, and 119 (19%) were in monochrome. Several subjects objected

that "black and white" in the questionnaire did not describe how they saw without colour. Some subjects use both colour and monochrome in their imaging.

Movement

Most people see movement in their visual recall. Movement was reported in 523 out of the 620 visually imaged memories (84%). For 87 subjects (14%) the visual imagery was in still pictures.

Self-Imaging

Most people do not see themselves in the scenes they image. Of the 620 memories imaged, 499 (80%) were using what Neisser has called 'a field view', that is as the participants saw the events at the time, without seeing themselves. There were 138 instances (22%) in which subjects imaged themselves as children taking part within the scene, that is an 'observer's view', as though seen by an outside observer. There were also 24 instances (4%) of 'both', where the self was both seen and not seen in the recall of the same event. Several subjects who reported 'both' in relation to particular memories explained that they switched views according to mental focus, rather like a Necker cube. The choice of 'field' or 'observer' views, or 'both' is not consistent for subjects. The same subject will often vary the choice among 6 different memories. Scrutiny of the topics of the memories suggests no ready correlation with the choice of view with which they are imaged.

It will be seen from Table 4.3.4.4 that the balance between imaging in colour or monochrome and of moving or still is considerably influenced by the encoding age of the memory. Memories from below age 6 are more likely to be monochromatic

and static than memories from later years. In contrast, the choice of 'field' or 'observer' views is almost unaffected by encoding age.

Table 4.3.4.4 Visual Imagery By Age Of Encoding

	<5 n=194	6-11 n=212	12-18 n=214	0-18 n=620
Monochrome	56 29%	33 15%	30 14%	119 19%
In Colour	137 71%	179 84%	182 85%	498 80%
No Movement	47 24%	21 10%	19 9%	87 14%
Movement	144 74%	187 88%	192 90%	523 84%
Self Image	44 23%	52 24%	42 20%	138 22%
No Self Image	156 80%	169 80%	174 81%	499 80%

Visual Imagery And Gender

Table 4.3.4.5 shows that men reported 9% more images in monochrome than women, and this difference was significant by Chi square test ($X^2 = 7.06$, df 1, $p<.01$). This may reflect a difference in the rate of early childhood development, since both sexes image without colour to a greater extent at the youngest encoding ages than they do later. Females seem to make the change sooner. Men also reported 4% more still images than women, but this difference was not significant. More women reported images seen from an observer point of view, but this difference was also not significant.

Table 4.3.4.5 Visual Imagery And Gender

Percentages of males and females reporting memories with different visual properties.

	Male n=53	Female n=56	% Difference
Monochrome	24	15	9 M>F
Colour	76	85	9 F>M
Still	17	13	4 M>F
Moving	83	87	4 F>M
Self Image	19	24	5 F>M
No Self Image	81	76	5 M>F

Visual Imagery By Subject Age

Unlike encoding age, Chi square tests showed that the age of subjects was not significantly related to imaging in monochrome or colour, or in still and moving pictures. (Chi square = 0.7 and 0.65, df 3, n.s. respectively).

There does seem to be signs of an increase of "observer" self-imaging in the 60's and 70's decades, but this also failed to reach significance, Chi square = 0.9 df 3, n.s.

Table 4.3.4.6 Visual Imagery By Subject Age

Mean numbers of memories with different visual properties.

	20-39 n=18	40-59 n=53	60-79 n=33	80-91 n=5
Monochrome In Colour	1.3 4.4	0.9 4.6	1.3 4.3	1.0 5.0
Movement No Movement	1.3 4.6	0.5 5.1	1.1 4.6	1.4 4.6
Self Imaging No Self Imaging	0.9 5.0	1.1 4.8	1.9 3.8	0.8 5.2

Auditory Imagery In Childhood Memories

The sense of hearing is the second most frequent sense that is a component of childhood memories, sight being the first. In the present research only 5 out of the 109 people in the sample (all with normal hearing) did not remember any sound as part of the memories they reported. Questions 4 and 5 asked whether subjects heard their own voice, other voices or other sounds when they remembered childhood events. Of the 104 subjects who remember hearing sound of any kind, several heard more than one of the above three categorises in a single memory. The resulting total of sounds heard was 668.

Within this total: 122 were remembering own voice (18%)

342 were remembering other voices (51%)

204 were remembering other sounds (31%)

The fact that other people's voices are remembered so much more than one's own is, perhaps, only to be expected. Receiving all vocal communications depends on listening to another's voice. But one does not need to listen to one's own voice when initiating a communication.

Auditory Imagery By Age Of Encoding

From Table 4..3.4.7 it will be seen that the incidence of recalling sound in a remembered event rises steeply up to the encoding age span 6–8. Own voice scores then continue to rise gently, while scores for other voices level out. Scores for other sounds show a slight decline after age 9–11. One might conjecture that this is because, by that age, most sounds have become familiar, and are therefore less memorable. Only 91 i.e. 14% of childhood memories involved voices. Not all voices were verbalising; some were crying, singing or simply shouting.

Table 4.3.4.7 Auditory Imagery By Age Of Encoding

Because the number of subjects differs within encoding age spans, incidence scores are shown as percentages of the actual number of subjects in each age span.

	< 3 n = 90 %	3–5 n = 108 %	6–8 n = 108 %	9–11 n = 109 %	12–14 n = 109 %	15–18 n = 109 %
Own voice	4	16	19	22	25	28
Other voices	30	44	63	63	60	63
Other sounds	20	23	32	40	37	34
Mean % total incidence	54	83	114	125	122	125

These data were analysed using Pearson's correlation tests. A significant relationship was found to exist between age of encoding and the incidence of own voice sounds in memories, $r = 0.92$, $df = 4$, $p < 0.01$. However, no such relationship was found for other voice sounds, $r = 0.79$, $df = 4$, $p = 0.06$, or for other sounds in general, $r = 0.79$, $df = 4$, $p < 0.07$. The increased incidence of 'own voice' in memories may reflect developing linguistic skills.

Auditory Imagery By Gender

As the numbers of men and women subjects differ, it is percentage of categoric incidence of different sounds that are compared. These show that there is virtually no difference between men and women in the way sound is imaged when adults recall their childhood experiences. Scores for the incidence of imaging ones own voice was 18% for both sexes, for other voices incidence was 51% men and 52% women, and for non-vocal sounds 31% men and 30% women.

Table 4.3.4.8 Auditory Imagery By Subject Age

Scores in each category represent the mean number of memories (out of 6) including that sound.

	20-39 n=18	40-59 n=53	60-79 n=33	80-91 n=5
Own Voice	1.9	1.05	0.85	0.6
Other Voices	3.6	2.9	3.5	2.0
Other Sounds	1.3	2.0	1.8	1.6

Of interest here is the fact that there seems to be some indication of an age-related decline in the reported incidence of own voice sounds in memories with the level of incidence dropping from 1.9 in the youngest age group to 0.6 in the oldest. This decline was found to be significant by Pearson's correlation test, $r = 0.97$, df 2, $p < 0.05$.

Comparison Of Visual And Sound Imaging By Subject Age

While the recall of sound plays a slightly decreasing role in the recall of childhood memories, the older the subject becomes, the part played by visual remembering remains virtually undiminished through decades ranging from the twenties into the nineties. This was seen in Table 4.3.4.3.

4.3.5 Vividness Of Sensory Imagery In Memories

Question 7 in the questionnaire asked subjects to rate the vividness of each of the senses in the recall of each event on a five-point scale, where 1 meant not at all and 5 meant as vivid as in real life. The results are shown in Tables 4.3.5.1.-4.3.5.3.

The vividness of sensory images was analysed in three ways. First, vividness was assessed by age of encoding. Next, differences in vividness across gender were explored. Finally, vividness by age of subject was examined.

A one factor within subjects ANOVA was used to examine the data for age of encoding differences in Table 4.3.5.1. The single factor was age encoding and the dependent variable was the overall mean rating of vividness of sensory imagery collapsed across sensations. There was a significant main effect of age of encoding $F(1,7) = 4.03$, $MSe = 0.24$, $p<0.05$. This indicates that, overall, vividness of sensory imagery increases with age of encoding.

Table 4.3.5.1 Ratings Of Vividness Of Sensory Imagery By Age Of Encoding

As numbers of subjects are not the same in all encoding age spans, scores are shown as means, i.e. the rating score for each sense within each age span divided by the number of subjects within it.

	<3 n = 90	3–5 n = 108	6–8 n = 108	9–11 n = 109	12–14 n = 109	15–18 n = 109	Σ : Mean
SIGHT	3.7	4.0	4.3	4.1	4.2	4.2	4.1
SOUND	1.2	1.8	2.0	2.7	2.6	2.8	2.2
TOUCH	1.0	1.0	1.2	1.2	1.3	1.2	1.2
SMELL	0.4	0.7	0.9	0.6	0.9	1.5	0.8
TASTE	0.1	0.1	0.4	0.2	0.0	0.2	0.2
HEAT	0.2	0.2	0.3	0.1	0.5	0.2	0.3
COLD	0.1	0.1	0.4	0.2	0.3	0.4	0.3
PAIN	0.2	0.2	0.2	0.1	0.2	0.2	0.2
Overall Mean	0.9	1.0	1.2	1.2	1.3	1.3	---

In general more recent memories are given higher vividness ratings by subjects. This effect is most marked for Sound and Smell. Very early memories <3 and 3-5 are consistently rated as being less vivid on these several dimensions than memories from subsequent childhood years.

Table 4.3.5.2 Ratings Of Vividness Of Sensory Imagery By Gender

	Male Mean Rating	Female Mean Rating	Female Higher By
Sight	3.94	4.34	0.41
Sound	3.46	3.92	0.46
Touch	3.46	3.49	0.03
Smell	3.46	3.87	0.40
Taste	2.71	3.82	1.11
Heat	2.00	2.67	0.67
Cold	2.53	3.64	1.11
Pain	2.37	4.64	2.27
	3.50	3.97	0.47

Table 4.3.5.2 shows that overall women consistently rate the vividness of sensory qualities in their memories higher than men. When the data were collapsed across sensation type the gender effect was found to be significant, $F(1,11) = 6.48$, $MSe = 2.608$, $p < 0.05$.

Table 4.3.5.3 Ratings Of Vividness Of Sensory Imagery By Subject Age

Subjects rated the vividness of each of the senses in each recall on a five point scale, where 1 meant not at all, and 5 meant as vivid as in real life.

Mean Rating Per Occurrence

	20-39 n=18	40-59 n=53	60-79 n=33	80-91 n=5
Sight	4.23	4.05	4.35	4.17
Sound	3.17	3.98	3.89	4.24
Touch	3.03	3.37	3.10	4.83
Smell	3.31	4.86	3.86	3.52
Pain	4.01	2.23	3.12	5.00
Taste	3.31	3.53	3.48	5.00
Heat	2.21	2.60	3.24	n/a
Cold	2.30	1.83	3.91	3.00
Overall Mean	3.52	3.78	3.92	4.21

From Table 4.3.5.3. it will be seen that subject age has no consistent relationship with the vividness of imaged recall. A one factor within subjects ANOVA was carried out with the subject age as the single factor and overall mean rating as the dependent variable. This confirmed that there was no effect of subject age, $F<1$. This accords with the earlier finding (Table 4.3.3.5) that clarity of memory is unaffected by increasing age. Thus, both findings together confirm that imagery is unaffected by ageing. The sudden upsurge in Table 4.3.5.3 for Sound and Touch during the oldest decade is based on too small a sample to be statistically reliable.

Also, there does appear to be an unexplained peak in the imaging of Smell for people in their forties and thereafter, a steady decline.

Comparative Scores Between Incidence And Vividness Of Sensory Imagery

Table 4.3.5.4 shows that the frequency with which particular senses are involved in the imaging of memories need have nothing to do with their vividness when they are involved. Pearson's correlation test confirmed that there was no significant relationship ($r = 0.69$, $df\ 6$, n.s.).

In the case of Touch and Smell, the relationship between incidence and vividness is actually reversed. Touch is recalled more often than Smell, yet the vividness of Smell is slightly higher. A similar reversal occurs with Cold and Taste. Cold is imaged more often than Taste, yet Taste receives a more vivid rating. The most extreme reversal concerns Pain. Only about one in fifty memories includes Pain, yet when it is recalled, its vividness is equal third in rank order.

Table 4.3.5.4 Incidence And Vividness Of Sensory Imagery

Sense	Mean Incidence Per Subject	Mean Vividness Rating
Sight	5.7	4.2
Sound	3.5	3.7
Touch	1.9	3.5
Smell	1.2	3.7
Heat	0.6	2.3
Cold	0.5	3.1
Taste	0.3	3.3
Pain	0.3	3.5

Assessing Realism

Question 8 in the questionnaire asks subjects to indicate the degree of realism in their specific memories (what Brown and Kulik call 'live quality' in their definition of flashbulb memories). Subjects were asked to choose between:

a) It's like a play-back. I can see and re-experience it again;
(maximal realism)

b) I don't really remember it happening. But I remember that it happened. I know certain facts about this event;
(not very realistic)

c) With an effort I can reconstruct the event, building up the picture by drawing from what I know about it;
(not at all realistic)

d) A mixture of 2 or more of the above.

Means of catergoric incidence are shown in Table 4.3.5.5.

Out of the total 633 memories, 620 (98%) were described as: "It's like a play-back. I can see and re-experience it again." This leaves little doubt that people hold on to, and mentally relive, personally meaningful childhood memories as part of themselves in the past. However, subjects' assessments for Realism were not always consistent with their ratings for Clarity in response to question 2, where they were asked whether a memory was Vividly Clear, Fairly Clear or Clouded and Vague. Sixteen subjects who, in question 8, chose maximal Realism, described Clarity in question 2 as only Fairly Clear or Vague.

Unstructured enquiry showed that subjects often differentiate in their own minds between what they regard as Clarity and Realism. It appears that Clarity may be equated with unclouded sharpness of visual imagery, while Realism represents a more holistic comparison between what was experienced at the event and what is being experienced at its recall. Thus, in a memory judged to have Realism, the feelings aroused at the time of the event are evoked by the memory.

Table 4.3.5.5 Subjects' Assessment Of Realism In Recalling Childhood Events By Age Of Encoding

The table shows the proportion of the total number of memories supplied by each age group classified at each level of realism.

	<3 n=90	3-5 n=108	6-8 n=108	9-11 n=109	12-14 n=109	15-18 n=109
a)	0.96	0.99	0.99	0.99	0.99	0.98
b)	0.03	0.01	0.01	-	0.01	0.02
c)	0.03	0.01	-	0.02	-	0.01
d)	-	-	-	-	-	-

The overwhelming preference across all encoding ages for "It's like a play-back. I can see and re-experience it again." would not necessarily apply so strongly to other methods of autobiographical research. In free recall, it is to be expected that the most realistic should come to mind. Nonetheless, the figures can leave no doubt that people regard some of their childhood memories as very realistic. Analysis by subject age and gender also showed no differences and, therefore, is not presented separately.

Realism Of Recall With Little Or No Sensory Imagery

How essential is imaging for realism of recall? The present study provides 8 memories from 7 subjects in which subjects claimed there was total absence of sensory imaging. Yet, all but one, claimed maximal or fairly high realism of recall.

In other words, replying to question 7, they said recall involved neither sight in the mind's eye, nor sound, smell, taste, touch, heat, cold or pain. But from the options offered in question 8, four insisted, even when challenged, on choosing: "It's like a play-back. I see and re-experience it again." (Two of them volunteered an amendment, deleting the words, 'I see'.)

Three subjects opted for the middle grade of realism, and only one (possibly a case of traumatic amnesia) chose the lowest grade. Where subjects denied imaging they were asked what form, then, does the remembering take? And "In a nutshell, what does this memory mean to you?" Their replies are quoted verbatim in Section 4.4 and further examined in the final discussion. In most of these cases the memory retained affect and sematic properties but no sensory qualities.

Imaging Without The Visual Sense

In addition to the above 8 cases without *any* sensory imaging, 10 other cases were provided by 10 subjects in which they claimed there was no visual imaging, although various other senses were involved.

Visual imaging is commonly rated as the most powerful contributor to recall. Yet in its absence, subjects' clarity ratings do not seem to have suffered as much as one might expect. Out of the 10 subjects, 2 chose the top rating option in question 2 of the questionnaire, rating the memory as Vivid and detailed; 6 chose Fairly clear; and only 2 chose Cloudy and vague.

These findings suggest that, though sensory, and especially visual imaging, usually plays a major role in determining recall, a memory can be real and vivid without

imaging. The re-experiencing must then consist entirely of affect, coupled with historical knowledge of the event.

How commonly is this likely to occur? Within the present sample, the 8 cases with no sensory imaging represent only 1.3% of the memories examined. If one adds the cases of substantially limited sensory imaging, namely total lack of visual involvement, the share rises to 2.8%. But if, instead of counting the memories, one counts the people who recalled them, then one finds that out of our 109 subjects as many as 17, i.e. 15% or more than one in six people, occasionally recall with little or no sensory imaging. An ability to remember without imagery is even more evident in the study by Nigro and Neisser (1983) where they found that out of 171 memories, 29 had neither 'field' nor 'observer' imaging.

4.3.6 Memory For The Context Of Events

In order to investigate how far childhood memories retain the context in which the remembered event occurred, subjects were asked whether they could remember what was happening immediately before the event they recalled, and what happened immediately after. (Questions 9 and 10 in the questionnaire - Appendix A). The responses showed that recall of both 'before and 'after' was very poor for early childhood memories supporting the view that they are contextually isolated 'islands' and these data were not analysed further.

4.3.7 Retention Of Emotional Intensity Over Time

In questions 12 and 13 of the questionnaire rating by subjects was on a five point scale for each of the emotions remembered to have been felt at the time of each of the events recalled. A rating of 1 meant hardly at all and 5 meant as intensely as in real life. A rating of 0 was recorded if the emotion was not experienced at all. The same rating procedure was immediately repeated for what was felt about the event 'now' at recall. These ratings are shown in Table 4.3.7.1. The difference between the 'then' and 'now' totals were percentaged, and the mean percentage scores for rated emotions are shown in the tables that follow. The emotions tabulated are the 12 with the highest incidence from within a list of 53 originally described by subjects (see Table 4.3.7.6).

The hypothesis that the emotional component of memory is adaptive would predict the retention in memory of adaptively useful negative emotions, i.e. what to avoid. Yet one would also expect the passing of time generally to reduce the intensity of both positive and negative emotions felt about an event that is no longer directly relevant to the present situation. This, too, is adaptive, for we would be ill equipped to deal with current needs if our emotional awareness were clogged by a possibly irrelevant past. Johnson, in her MEM model (1986) has pointed out that one function of the reflective system is to allow us to think about tigers without experiencing actual terror.

The expectations of retention and the selectivity as to what is retained are both confirmed in Tables 4.3.7.2 and 4.3.7.3. Thus, the largest differences between ratings for 'at event' and 'at recall' are for Surprise, Anxiety and Excitement, all of which depend on the novelty of a situation or on uncertainty about the future. Hence, once the unknown future has become the familiar past, there is no rational

place for these particular emotions. It is, indeed, surprising that they should persist at all at recall. (This anomaly is particularly evident in old age, as can be seen later in 4.3.7.4).

The emotion of Happiness receives a slight increase in rating for 'now', with a corresponding decrease for Unhappiness. Scrutiny of relevant memories suggests this is often because something which at the time was an unhappy disaster (e.g. doing a wee where one shouldn't) becomes, in adult recall, a happily amusing incident within a generally nostalgic view of childhood. Rating differences between 'then' and 'now' are lowest for the negative emotions: Disappointment, Frustration, Fear, Anger, Grief, Pain and Jealousy, but these received very low ratings. (Mean ratings are less than 1 where 1 = Hardly at all and 0 = not experienced).

Rating differences between 'then' and 'now' cannot be regarded as erosion over time as both ratings are being given at the same time, that is now. A correct interpretation of the information provided by subjects should, therefore, read: "Even after the passage of (in some cases) very many years, I can still remember how I felt about it when it happened, and I can still feel some echo of the feeling now when I remember it." This is, of course, consistent with the adaptive view of the emotional component.

TABLE 4.3.7.1

SUBJECTS' RATINGS OF EMOTIONS FELT BY ENCODING AGE

(Scores are mean on a 0 - 5 point scale)

	<3		3-5		6-8		9-11		12-14		15-18	
	AT EVENT	AT RECALL	AT EVENT	AT RECALL	AT EVENT	AT RECALL	AT EVENT	AT RECALL	AT EVENT	AT RECALL	AT EVENT	AT RECALL
HAPPINESS	2.2	2.1	1.8	2.1	2.0	2.2	2.0	2.2	2.1	2.4	2.4	2.3
EXCITEMENT	1.6	0.8	2.0	0.9	2.6	0.8	2.8	0.9	2.8	1.1	3.0	1.1
UNHAPPINESS	1.6	0.9	2.3	0.9	2.3	1.2	2.2	1.0	2.0	1.1	2.1	1.2
ANXIETY	1.7	0.4	2.0	0.4	2.4	0.6	2.4	0.3	2.4	0.3	2.4	0.3
SURPRISE	1.1	0.1	1.8	0.2	1.9	0.1	1.7	0.2	1.8	0.2	1.7	0 2
DISAPPOINTMENT	0.5	0.3	1.1	0.6	0.9	0.3	0.9	0.4	0.9	0.7	1.1	0.9
FRUSTRATION	0.6	0.3	1.2	0.3	1.0	0.3	0.7	0.2	1.0	0.3	1.4	0.6
FEAR	0.9	0.1	1.1	0.1	1.4	0.4	1.2	0.1	1.0	0.2	1.1	0.1
ANGER	0.5	0.2	0.8	0.4	0.8	0.5	0.6	0.4	0.8	0.3	0.8	0 4
GRIEF	0.2	0.2	0.3	0.2	0.5	0.1	0.4	0.2	0.3	0.1	0.4	0.4
PAIN	0.3	0.1	0 4	0.1	0.3	0.1	0.2	0.0	0.5	0.1	0.2	0 0
JEALOUSY	0.1	0.1	0.1	0.0	0.1	0.0	0.2	0.0	0.1	0.0	0.1	0 0
OTHER	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0 0	0.0

Retention Of Emotions By Encoding Age

A two factor within subjects ANOVA was carried out on the data shown in Table 4.3.7.2. The first factor was encoding age (2 levels; 0-8 and 9-18) The second factor was occasion (at event and at recall). The dependent variable was overall mean emotion rating. There was no significant effect of encoding age. However, a reliable main effect of occasion was found, $F(1, 12) = 6.48$, $MSe = 13.78$, $p < 0.01$. This shows that emotions were significantly stronger at the time of the event. There was no significant interaction of encoding age and occasion.

Table 4.3.7.2 Subjects' Ratings Of Emotion Felt By 2 Encoding Age Periods: 0 - 8 & 9 - 18

(Scores are mean ratings on a scale of 0 - 5)

	0–8		9–18	
	At Event	**At Recall**	**At Event**	**At Recall**
Happiness	2.0	2.1	2.2	2.3
Excitement	2.1	0.8	2.9	1.0
Unhappiness	2.1	1.0	2.1	1.1
Anxiety	2.1	0.5	2.4	0.3
Surprise	1.6	0.1	1.7	0.2
Disappointment	0.9	0.4	1.0	0.7
Frustration	1.0	0.3	1.0	0.4
Fear	1.1	0.2	1.1	0.1
Anger	0.7	0.4	0.7	0.4
Grief	0.3	0.2	0.4	0.2
Pain	0.3	0.1	0.3	0.0
Jealousy	0.1	0.0	0.1	0.0
Other	0.1	0.0	0.0	0.0

FIG. 4.3.7.1

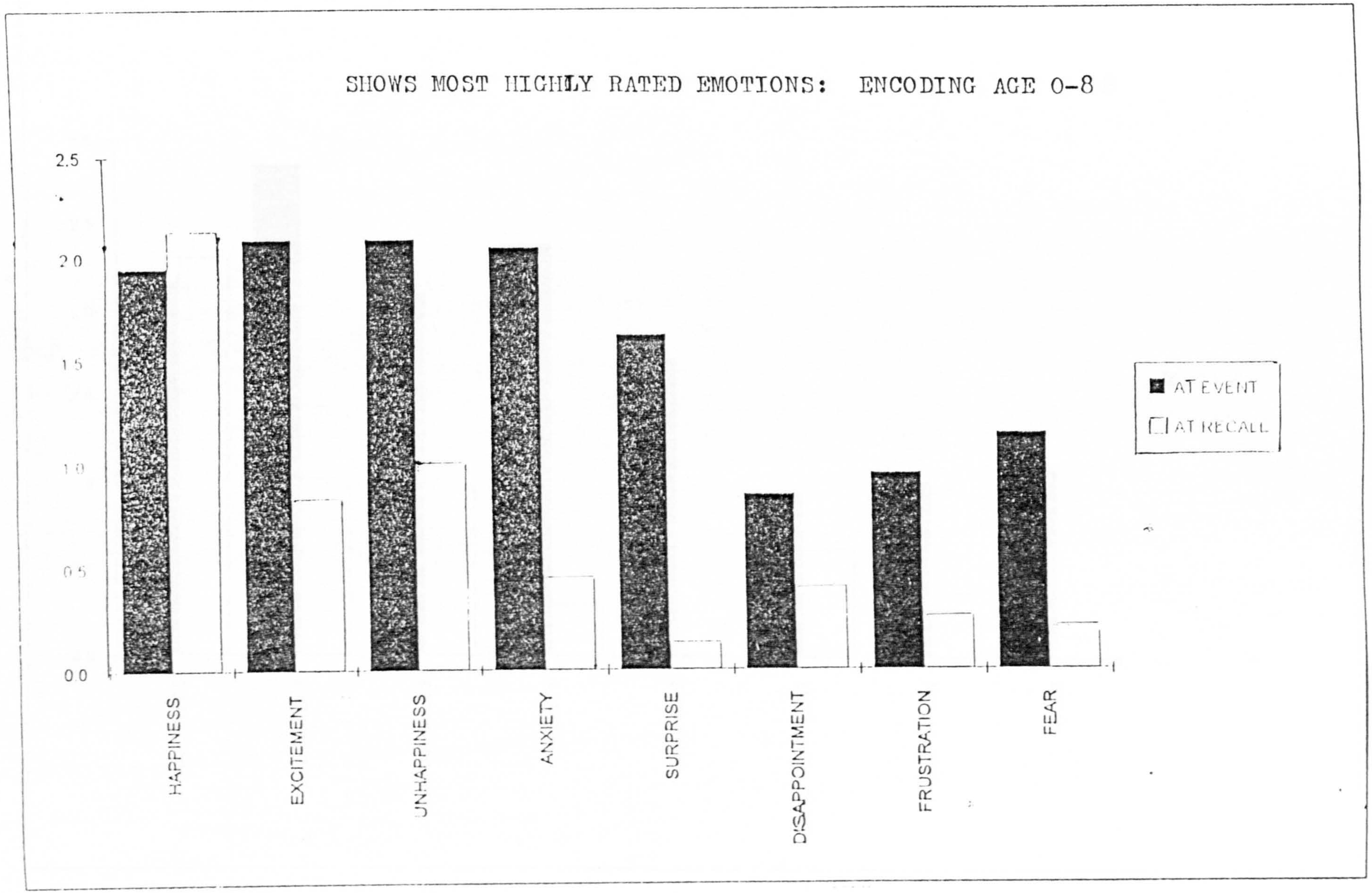
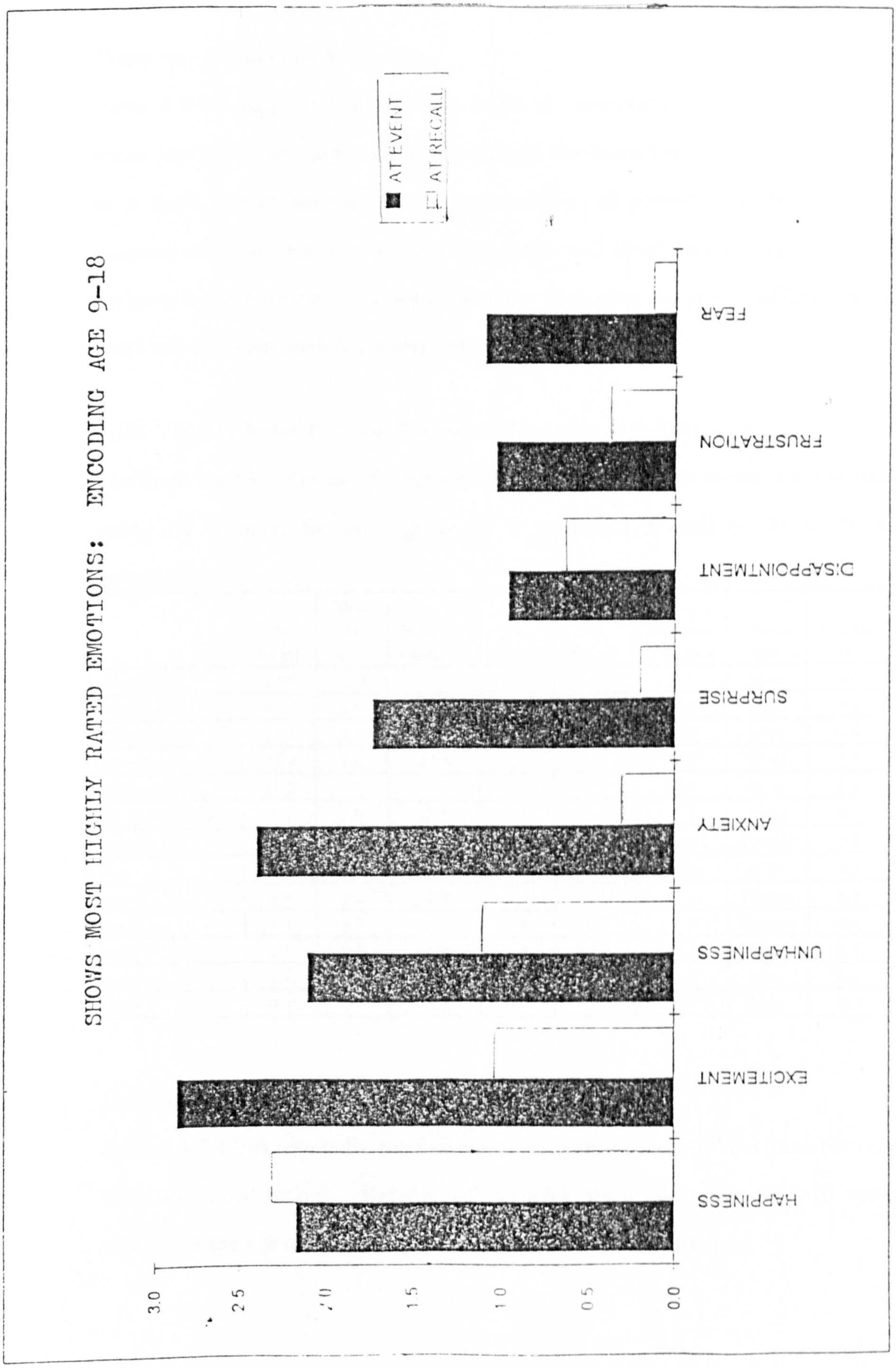

SHOWS MOST HIGHLY RATED EMOTIONS: ENCODING AGE 0-8
2.5
2.0
1.5
1.0
0.5
0.0
AT EVENT
AT RECALL
HAPPINESS
EXCITEMENT
UNHAPPINESS
ANXIETY
SURPRISE
DISAPPOINTMENT
FRUSTRATION
FEAR

FIG. 4.3.7.2


AT EVENT
AT RECALL
SHOWS MOST HIGHLY RATED EMOTIONS: ENCODING AGE 9-18
FEAR
FRUSTRATION
DISAPPOINTMENT
SURPRISE
ANXIETY
UNHAPPINESS
EXCITEMENT
HAPPINESS
3.0
2.5
2.0
1.5
1.0
0.5
0.0

Retention Of Emotions By Gender

Table 4.3.7.3 suggests that when an event is remembered, men, on the whole, retain less of the emotions felt at the time of the event than women do On the other hand, women seem to show a greater decline of intensity at recall for certain negative emotions, namely: Frustration, Anger and Grief, though the emotion of Jealousy is more strongly retained by women. However, the gender differences are small and were not analysed statistically.

Table 4.3.7.3 Subjects' Mean Ratings Of Emotions Felt By Gender

(As there are 53 males and 56 females, ratings are shown as means, i.e. the total rating for emotion for each group of 6 memories divided by 53 or 56 as appropriate)

	At Event	Male At Recall	Increase/ Decrease	At Event	Female At Recall	Increase/ Decrease	Change for	Greater By
Happiness	10.9	12.1	1.2	13.6	13.9	0.3	Male	0.9
Excitement	15.3	4.6	-10.7	13.7	6.3	-7.4	Male	3.3
Unhappiness	12.1	5.8	-6.3	12.3	6.8	-5.5	Male	0.8
Anxiety	13.4	1.6	-11.8	12.3	2.9	-9.4	Male	2.4
Surprise	10.2	0.7	-9.5	9.3	1.3	-8.0	Male	1.5
Disappointment	5.3	2.8	-2.5	5.1	2.8	-2.3	Male	0.2
Frustration	5.8	2.0	-3.8	5.7	1.7	-4.0	Female	0.2
Fear	6.7	0.7	-6.0	6.4	1.5	-4.9	Male	1.1
Anger	4.3	2.4	-1.9	4.3	2.1	-2.2	Female	0.3
Grief	1.3	0.9	-0.4	2.8	1.8	-1.0	Female	0.6
Pain	2.1	0.3	-1.8	1.5	0.4	-1.1	Male	0.7
Jealousy	1.1	0.1	-1.0	0.8	0.2	-0.6	Male	0.4
Other	0.4	0.1	-0.3	0.2	0.2	0.0	Male	-0.3

Retention Of Emotional Intensity By Subject Age

Table 4.3.7.4 lists results for the five emotions with the largest differences between 'then' and 'now' ratings. Because sub-samples are small within the two upper decades of the age range, results are collapsed into 20-year periods.

A two factor within subjects ANOVA was carried out in which the first factor of subject age had 4 levels and the second factor, occasion, had 2 levels (at event and at recall). The dependent variable was the mean emotion ratings. There was no significant effect of subject age, $F<1$, indicating that the emotional intensity of memories is retained as people grow older. There was a significant effect of occasion, $F(1,4) = 15.09$, $MSe = 1417.29$, $p < 0.02$. Mean emotion ratings fell from 8.7 at event to 2.2 at recall. A significant interaction was observed, $F(3, 5) = 4.685$, $MSe = 27.02$, $p < 0.03$, such that the loss of emotional intensity was less in the oldest group.

Overall, the table shows that people tend to lose the intensity of their original feelings over the years, until they reach the age of 80 and over. Then, there appears to be a drop in the difference between 'then' and 'now' ratings. This may suggest that old people re-experience their recall of childhood events with greater realism, and so can recapture such feelings as Surprise and Anxiety, which had previously largely disappeared because both the event and its outcome were already familiar. However, the small number of subjects in this oldest group means that any interpretation must be speculative.

The evidence lends support to what Salaman (1982) wrote quoting various authors to the effect that childhood memories lie dormant during the busy turmoil of life's active years, but surface again in the mind during the quietness of old age.

TABLE 4.3.7.4

MEAN RATINGS OF RETENTION OF EMOTIONAL INTENSITY BY SUBJECT AGE

Key: E = at event; R = at recall

	20-39			40-59			60-79			80-91		
	E	Increase/ (Decrease)	R	E	Increase/ (Decrease)	R	E	Increase/ (Decrease)	R	E	Increase/ (Decrease)	R
Excitement	13.4	-7.7	5.7	14.6	-9.0	5.6	13.2	-8.1	5.1	15.4	-5.5	9.9
Anxiety	13.6	-11.6	2.0	14.3	-12.1	2.2	11.0	-9.2	1.8	5.1	-2.6	2.5
Surprise	8.6	-8.1	0.5	9.4	-8.5	0.9	10.9	-9.8	1.1	7.3	-5.7	1.6
Fear	6.6	-5.1	1.5	7.3	-6.1	1.2	5.3	-4.6	0.7	5.3	-4.0	1.3
Jealousy	0.7	-0.5	0.2	0.8	-0.6	0.2	0.6	-0.4	0.2	0.0	0.0	0.0

NOTE: Figures for "At Event" and "At Recall" for each emotion are the total ratings within the age group divided by the number of subjects within the group.

Happy And Unhappy Emotions Felt At Recall Of Childhood Memories

Previous research has tended to show a preponderance of happy memories which has been dubbed 'the Pollyanna Principle' (Cohen 1996). However, the answer to the question: "Do we mostly recall happy or unhappy memories?" does not permit a simple answer. An overall count may suggest a slight bias towards 'happy' (see Table 4.3.7.5). A Chisquare test showed that the relative incidence of happy and unhappy memories did not change significantly with age of encoding. ($X2 = 1.47$, df 1, n.s). However, the assessment of the happiness of autobiographical memories is complicated. A straight count measures only incidence and not intensity. It takes no stock of the impact of recalling the event, i.e. its emotionality or personal meaning which may vary greatly between different people and different types of memory. For example a single memory of a sad death or suffering may well outweigh in emotional impact, several memories of jolly social occasions. Thus, incidence alone offers no valid measure of happiness or unhappiness.

Nor is an assessment of affect at the time of the event necessarily true at recall. Reversals from unhappy at the time to happy now are not uncommon. To complicate matters further, nearly a third of all subjects reported mixed feelings of both joy and regret about different aspect of the same memory.

However, Tables 4.3.7.6 – 8 do provide an indication of the different types of emotion which were classed as happy or unhappy. It will be seen that under the broad umbrella of happy childhood nostalgia there is the cosy comfort of parental love and care and also the security of family togetherness. Not surprisingly, in a later table (4.3.12.2) it will be seen that such topics chiefly provide the happiness in memories encoded before age 9. Egocentricity, which Piaget noted as characteristic of early childhood, is evident in Table 4.3.7.7 which shows 'self-

centred' topics to account for 20% of happy memories, while 'other-centred' accounts for only 2%.

Of 633 memories, 490 had Happy or Unhappy emotions associated with them. Of these 490, 475 (97%) could be unambiguously classified as Happy (52%) or Unhappy (48%). Classification was by consensus between three independent judges who read the summarised version of each event, as previously approved by the subject after verbally providing the memory.

Table 4.3.7.5 Happy Unhappy Balance

Age	Happy	Unhappy	Difference
0 - 8	60%	40%	20% more happy
9 - 18	54%	46%	8% more happy

Table 4.3.7.6 Incidence Of Happy Unhappy Emotions Felt At Recall

HAPPY	No.	UNHAPPY	No.
Nostalgia for childhood/youth	35	Resentment/anger	20
Family togetherness	31	Anxiety	20
Achievements	28	Fear of physical harm	18
Amusing to recall	23	Embarrassment	17
Happy excitement	19	Disappointment	17
Thrill of novelty/adventure	18	Frustration	15
Love of parents	16	Sadness	15
Peaceful contentment	11	Insecurity	13
Pride/self-satisfaction	10	Shame	10
Security	9	Rejection	9
Self-confidence/independence	9	Concern for others	9
Interesting to recall	9	Self-conscious concern	7
Freedom	5	Guilt	6
Group enjoyment	5	Unhappy to remember	6
Relief	5	Bewilderment	5
Gratitude	4	Injustice	4
Happy friendships	4	Fear of unknown	4
Happy centre of attention	2	Shock	4
Sex/romance	2	Sad parting	3
Happiness for others	1	Jealousy	3
Luck	1	Unpleasant duty	3
Beauty of nature	1	Pain/discomfort	3
		Fear of human discord	3
		Fighting back	3
		Boredom	3
		Loneliness	2
		Nausea	1
		Crowd phobia	1
		Dislike of ritual	1
		Hopelessness	1
		Seeing disfigurement	1
Total	248		227

Note: This omits emotions not easily classified as Happy or Unhappy

Table 4.3.7.7 Focal Areas Of Happy Emotions

NOTE: There is probably considerable overlap between 'nostalgia' and 'family' centred categories. 'Nostalgia for childhood' is unlikely to exclude a family context.

	No.	% of 248 happy emots.
NOSTALGIA CENTRED		
Nostalgia for childhood/youth	35	14
Amusing to recall	23	9
Interesting to recall	9	4
	67	27
FAMILY CENTRED		
Family togetherness	31	13
Love of parents	16	6
Cosy contentment	11	4
Childhood security	9	4
	67	27
SELF CENTRED		
Achievements	28	11
Pride/self-satisfaction	10	4
Self-confidence/Independence	9	4
Happy centre of attention	2	1
Luck	1	-
	50	20
EXCITEMENT CENTRED		
Excited arousal	19	8
Thrill of novelty/adventure	18	7
	37	15
ESCAPE CENTRED		
Freedom	5	2
Relief	5	2
Enjoying beauty of nature	1	-
	11	4
PEERS CENTRED		
Group enjoyment	5	2
Happy friendships	4	2
Sex/romance	2	1
	11	4

OTHERS CENTRED Gratitude Happiness for others	 4 1	 2 -
	5	2
TOTAL*	248	100%

* This omits emotions not easily classified as Happy or Unhappy

Table 4.3.7.8 Focal Areas Of Unhappy Emotions

	No.	% of 227 unhappy emots.
SELF-CENTRED		
Resentment/anger	20	9
Anxiety	20	9
Fear of physical harm	18	8
Embarrassment	17	8
Disappointment	17	8
Sadness	15	8
Frustration	15	7
Insecurity	13	6
Shame	10	5
Rejection	9	4
Self-conscious concern	7	3
Guilt	6	3
Unhappy to remember	6	3
Bewilderment	5	2
Injustice suffered	4	2
Fear of the unknown	4	2
Shock	4	2
Jealousy	3	1
Fighting back	3	1
Boredom	3	1
Loneliness	2	-
Hopelessness	1	-
	200	92
FAMILY CENTRED		
Fear of discord	3	1
Sad parting	3	1
	6	2
PHYSICAL DISCOMFORT CENTRED		
Unpleasant duty	3	1
Pain/discomfort	3	1
Nausea	1	-
Crowd phobia	1	-
	8	2
OTHERS CENTRED		
Sympathy/concern for others	9	4
Dislike of ritual	1	-
Horror at disfigurement	1	-
	11	4
TOTAL	227*	100%

* This omits emotions not reliably classifiable happy / unhappy

Emotional Reversals And Mixed Feelings

It is interesting to note that of the 633 memories, only 10 memories (1.58%) showed a reversal from happiness to unhappiness between encoding and recall, whereas 81 (12.8%) showed a reversal from unhappiness to happiness.

In addition, 55 memories (8.7%) included mixed feelings of both happiness and unhappiness. For example, one subject remembered being happy to have won 2nd prize, but disappointed it was not 1st prize. It is therefore evident that categorisation of autobiographical memories into merely happy / unhappy could be simplistically misleading.

4.3.8 Frequency Of Recall Of Childhood Memories

Question 14 of the questionnaire asked how often the memory was recalled. Clearly, this is an important factor in the retention of childhood memories and in the maintenance of their quality. Table 4.3.8.1 shows frequency of recall for each Age of Encoding band. It is clear that the Encoding age of a memory seems to play little or no part in determining the frequency of its recall. Considerable variation is likely to exist between different people and the frequency with which they recall memories of specific events. But in general, the figures suggest that some 4 out of 10 people will recall a particular memory once in every few years. Over 3 out of 10 people, once or twice a year. 2 out of 10 subjects say they recalled the event they remembered in this study less often than once in ten years, while fewer than 1 in 10 said they recalled it as often as once or twice a month.

Table 4.3.8.1 Percentages Of Subjects Reporting Each Level Of Frequency Of Recall For each Age Of Encoding Band

Age Of Encoding

Frequency	< 3 n=90	3 - 5 108	6 - 8 108	9 - 11 109	12 -14 109	15 - 18 109	0 - 18 633
Once or twice a month	3.3	4.6	6.5	3.7	5.5	6.4	5.1
Once or twice a year	37.8	32.4	28.7	26.6	29.4	32.1	30.9
Once every few years	40.0	47.2	46.3	44.0	44.0	43.1	44.2
Less than once every ten years	18.9	15.8	18.5	25.7	21.1	18.4	19.8

These data were not analysed formally because it was clear that there was no consistent trend related to age of encoding. There was no significant difference between men and women in frequency of recall.

Frequency Of Recall By Subject Age

The trends evident in frequency of recall by subject age suggest a tendency to reminisce more frequently with advancing years. Recall of specific events "Once or twice a month" is seen to occur far more often after the age of 70 than it did in earlier years. Conversely, the less frequent recall "Once every few years" is seen to be more common before the age of 60. However, the smallness of the sub-samples at the extreme upper end of the age range does not permit statistically acceptable levels of confidence.

Table 4.3.8.2 Percentages Of Memories Recalled At Each Level Of Frequency As Reported By Subjects In Each Decade Of Subject Age

	20-29 n=11 64 mem	30-39 n=7 42 mem	40-49 n=30 174 mem	50-59 n=23 131 mem	60-69 n=18 105 mem	70-79 n=15 87 mem	80-89 n=3 17 mem	90+ n=2 12 mem	Σ
Once or twice a month	1.6%	4.8%	4.6%	3.8%	3.8%	10.4%	11.7%	8.3%	5.2%
Once or twice a year	45.3%	21.4%	30.4%	28.3%	34.3%	28.7%	41.2%	16.7%	31.3%
Once every few years	51.5%	52.4%	43.7%	47.3%	41.0%	33.3%	41.2%	58.3%	44.1%
Less than once every 10 years	1.6%	21.4%	21.3%	20.6%	20.9%	27.6%	5.9%	16.7%	19.4%

4.3.9 Origins Of Memories

Wherever external reminders of childhood experiences occur, there is a danger that some aspect of the reminder will distort or replace the objective facts of the original event. This is especially likely to happen in memories from infancy, where adult recall is based on secondary sources such as photographs or family stories. For each recall, question 16 in the questionnaire checks whether the memory origin is entirely first hand or helped by any external reminders.

Table 4.3.9.1. shows that people judge the origins of memories across all encoding age periods, from birth to 18, to be almost entirely first-hand, rather than influenced by any external reminders. For the youngest age span, encoded before age 3, there are a few instances where reminders were acknowledged to have assisted remembering.

Table 4.3.9.1 Origins Of Memories By Age Of Encoding

Key: a) entirely first-hand

b) based on seeing photos, diaries, family talk, etc.

c) a mixture of these

To allow for differences of subject numbers in encoding age periods, results are expressed as percentages of the maximum possible incidence in each encoding age span.

	< 3 n=90 %	3-5 n=108 %	6-8 n=108 %	9-11 n=109 %	12-14 n=109 %	15-18 n=109 %	Totals %
a)	92	92	95	97	98	97	95
b)	2	3	1	4	1	1	2
c)	8	4	4	5	2	2	4

Note: Differences in scores between age periods are too small to be significant.

Memory Origins By Gender

Table 4.3.9.2 clearly shows that men and women do not differ in attributing their childhood memories to first-hand experience or to other origins. The differences shown in the table are too small to be significant.

Table 4.3.9.2 Memory Origins By Gender

Key: a) entirely first-hand

b) based on seeing photos, diaries, family talk, etc

c) a mixture of these

To allow for unequal numbers of memories among men and women, results are expressed as percentages of the maximum possible incidence in each category.

	Male 308 mems.	Female 325 mems.	Σ
a)	94%	96%	95%
b)	2%	2%	2%
c)	3%	3%	3%

4.3.9.3 Memory Origins By Subject Age

It is clear from Table 4.3.9.3 that there is very little variation by subject age. Overwhelmingly, almost all the subjects reported their memories were based on first-hand experiences. Differences are too small to be significant.

Table 4.3.9.3 Memory Origins By Subject Age

Percentages of subjects in each age band reporting different memory origins

Key: a) entirely first-hand

b) based on secing photos, diaries, family talk, etc

c) a mixture of these

	20s n=11 %	30s 7 %	40s 30 %	50s 23 %	60s 18 %	70s 15 %	80s 3 %	90s 2 %	Σ
A)	98	95	95	94	95	92	100	100	96
B)	-	2	1	3	1	7	-	-	2
C)	3	7	6	4	5	1	-	-	3

4.3.10 Types Of Cues Triggering Recall

It is, perhaps, only to be expected that cues which trigger personal memories should be as diverse and personal as the memories they evoke.

Each of the categories listed in Tables 4.3.10.1 - 2 represents not one thing, but a vast range of possibilities under each categoric umbrella. Nor are the categories mutually exclusive; usually several are simultaneously involved. Indeed, it would be rare for only one sense to be aware. From within the complex amalgam of input, it is difficult, perhaps even impossible, to isolate a single factor or specific combination of factors that triggered a particular memory. (Was it really just a madeleine cake that triggered Proust's prodigious recall?)

For manageability cues categorised under four types:

Perceptual = sensory input: sight, hearing, smell, taste, touch, heat, cold or pain.

Action = something the subject or someone else does.

Emotional = recognition of a particular feeling that belongs to the event.

Verbal = arising from a 'spoken' train of thought, either alone or in conversation with others.

The four categories: Perceptual, Action, Emotional, Verbal have been collapsed from more extended answers offered by subjects in response to question 17 which asked:-

What sort of things bring this memory to your mind?

Would it be something you see or hear?

(If yes) Always the same one?

Do other senses like smell, taste, touch, heat, cold, pain ever remind you of this event?

Does any particular action remind you of it – something you do or someone else does?

Does it come to mind with a particular kind of feeling which you recognise as belonging to this event?

Or is it produced by a train of thought?

The attempt has been to select the predominant category for each memory, though no precision is possible. Often, cueing involves doing or seeing something done

while hearing something at the same time. The verbal category also includes silently verbalising a train of thought, even though subjects may be unaware what brought the train of thought to mind.

Bearing in mind the probability that several cues act in combination, the high incidence for the 'emotional' (feeling) category in Tables 4.3.10.1 - 2 should not be interpreted as meaning a memory was solely, or even primarily, triggered by the re-experiencing of an emotion, though this could be. The response refers to the awareness of a particular feeling that was recognised as belonging to the event, and resuscitated by its recall.

At the time of remembering, the particular feeling may well have been occasioned by some other environmental or mental conditions. Yet, without its presence, the effectiveness of other triggering factors, alone may not have reached the threshold needed for recall. As one subject (already quoted earlier) put it: "I can't think of that now – I'm not in the mood." This subject was a woman, aged 56. The event, encoded at younger than age 3 concerned trying to totter unaided down a garden path to reach some flowers, and being caused needlessly to fall down because of her mother's scream of panic when she saw her. When her father picked her up she wept with rage and frustration. She reported both these emotions, as well as 'unhappiness' as being felt 'now, at recall' in answer to question 13. Indeed, the subject additionally volunteered: "I remember it so vividly because I can still feel my anger". When asked about the remaining emotions listed on the questionnaire (h–m), she brushed the question aside with "I can't think of that now – I'm not in the mood." Clearly, it was 'being in the mood', harbouring persistent anger at needless frustration, that enabled her to remember this specific tumble out of the many she must have experienced while learning to walk.

Table 4.3.10.1 Type Of Cue By Age Of Encoding

Type	< 3 n = 90 %	3–5 n = 108 %	6–8 n = 108 %	9–11 n = 109 %	12–14 n = 109 %	15–18 n = 109 %	Σ n = 633 %
Perceptual	84	83	83	90	85	83	85
Action	24	25	39	33	45	39	34
Emotional	77	88	88	85	80	83	84
Verbal	55	54	51	52	47	45	51

Note: Columns do not add to 100% because more than one cue type is sometimes involved in a single memory. n = number of memories in each encoding period.

Table 4.3.10.1 shows that the perceptual category of cues predominates across all encoding age periods. The relatively high rating for "Emotion" in Tables 4.3.10.1 - 2 may indicate the conscious presence of an emotional response to what is being perceived rather than a cueing factor in its own right. There is a noticeable increase in 'action' cueing after age 5.

The data in Table 4.3.10.1 were recoded and ranked so that percentages across age groups were treated as subjects. This allowed a Friedman test to be carried out to examine whether there was a greater incidence of one cue type over another. There was a significant effect of cue type, Chisquare = 19.05, df = 3, $p<0.01$ with perceptual and emotional cues significantly more frequent than action or verbal cues at all encoding ages.

Men and women do not differ significantly in the cue categories that respectively trigger their childhood memories.

Table 4.3.10.2 Type Of Cue By Subject Age

CUE TYPE	20s n = 63 %	30s 42 %	40s 174 %	50s 132 %	60s 105 %	70s 87 %	80s 18 %	90s 12 %	Σ 633 %
Perceptual	85	83	85	83	79	87	94	83	85
Action	22	31	51	26	39	27	55	16	34
Emotional	87	97	90	84	79	80	83	8	84
Verbal	41	50	40	55	60	62	67	17	49

Note: n = number of memories in each decade.

A Friedman test of the ranked data again showed a significant effect of cue type, Chi square = 19.05, df = 3, $p<0.01$ showing that for subjects of all ages perceptual and emotional cues predominate.

Table 4.3.10.2 shows that subject age does not change the rank order of cueing categories, except in the 40s decade. Here there is a marked reversal where 'action' takes numerical precedence over 'verbal'. One could surmise that in the 40s decade there are likely to be active children in the family reminding adults of what they themselves did at that age. Figures for 80 plus should be disregarded as statistically unreliable due to the smallness of the sub-sample. Nevertheless, they do indicate consistency in the rank order of cue types.

4.3.11 Personal Meanings Of Memories

This relates to the final question in the questionnaire. The subject, having been asked to analyse a reported memory into its various components, was here invited to summarise its holistic personal meaning. In order to ensure a manageable, nut-shell answer rather than an elaborated discourse, the question was phrased: 'If you had to store this memory in a file, how would you label it? What does it mostly mean to you?"

Responses were categorised by consensus between three independent judges. 57 categories were identified. The fact that, with few exceptions, these are categories of affect lends support to the hypothesised inclusion of an adaptively necessary affect factor in autobiographical memories to enable and encourage us to learn from experience. Out of the total 633 memories examined, personal meaning was described in terms of emotion in 468 cases i.e. 77%. This suggests that for most subjects 'emotion' and 'personal meaning' are inseparable, and synonymous. Some memories evoked more than one kind of emotion, hence the total number of examples in the 57 categories was 490.

Personal meanings show many differences across encoding age periods: birth to 8 and 9 to 18. A rank order across the whole encoding age spans, birth to 18, is given in Table 4.3.11.1. Table 4.3.11.2 shows there is no significant difference between the number of categories evoked by childhood memories encoded before or after age 9. But there is considerable difference in the incidence of some of the categories involved. Nostalgic recall of the caring warmth, the security, the parental love and the togetherness of family life is much more evident before the age of 9. Conversely, but by a smaller margin, categories like personal achievements and emotions that involve self-awareness, such as pride, shame,

embarrassment and frustration, as well as altruistic concern for others are more common after the age of 9. It is, perhaps, more than coincidental that 'self-confidence/independence' peaks in the 6–8 age group which often seems to mark a mental and physical dividing line between infancy and childhood.

Table 4.3.11.1 Rank Order Of Personal Meanings

The Category Labels

These aim to identify the essence of subjects' verbatim statements concerning the personal meanings of memories encoded from birth to age 18. Whilst short labels cannot hope to describe complex feelings, they can perhaps sufficiently indicate the general nature of the personal meaning.

Rank order		No.	% of 490 total
1	Nostalgia for childhood/youth	35	7
2	Cosy family togetherness	31	6
3	Achievements	28	6
4	Amusement at recall	23	5
5	Resentment/anger	20	4
5	Anxiety	20	4
7	Happy excitement	19	4
8	Thrill of novelty/adventure	18	4
8	Fear of physical harm	18	4
10	Embarrassment	17	3
10	Disappointment	17	3
12	Love of parents	16	3
13	Frustration	15	3
13	Sadness	15	3
15	Insecurity	13	3
16	Peaceful contentment	11	2
17	Shame	10	2

17	Pride/self-satisfaction	10	2
19	Security	9	2
19	Rejection	9	2
19	Self-confidence/independence	9	2
19	Sympathy/concern for others	9	2
19	Interesting to recall	9	2
24	Surprise	7	1
24	Self-conscious concern	7	1
26	Guilt	6	1
26	School days feeling	6	1
26	Unhappy to remember	6	1
29	Bewilderment	5	1
29	Freedom	5	1
29	Group enjoyment	5	1
29	Relief	5	1
33	Injustice	4	1
33	Fear of the unknown	4	1
33	Gratitude	4	1
33	Happy friendships	4	1
33	Shock	4	1
38	Sad parting	3	1
38	Jealousy	3	1
38	Unpleasant duties	3	1
38	Pain/discomfort	3	1
38	Fear of human discord	3	1

38	Boredom	3	1
38	Fighting back	3	1
45	Sex/romance	2	-
45	Happy centre of attention	2	-
45	Loneliness	2	-
48	Happiness for others	1	-
48	Nausea	1	-
48	Crowd phobia	1	-
48	Luck	1	-
48	Vivid dream	1	-
48	Dislike of ritual	1	-
48	Hopelessness	1	-
48	Horror at seeing disfigurement	1	-
48	Heightened awareness in crisis	1	-
48	Beauty of nature	1	-
	TOTAL	490	

Table 4.3.11.2 Incidence Of Categories Of Personal Meaning Evoked By Memories Encoded In Age Periods Under 8 & 9 - 18

(Only categories amounting to 2% or more of the total are shown)

CATEGORY	ENCODING SPAN		TOTAL
	Birth–8	9–18	
Nostalgia	20	15	35
Family togetherness	24	7	31
Achievements	5	23	28
Amusing to recall	8	15	23
Resentment/anger	11	9	20
Anxiety	8	12	20
Happy excitement	7	12	19
Thrill of novelty/adventure	9	9	18
Fear of physical harm	12	6	18
Embarrassment	5	12	17
Disappointment	5	12	17
Love of parents	12	4	16
Frustration	6	9	15
Sadness	7	8	15
Insecurity	9	4	13
Peaceful contentment	6	5	11
Pride/self-satisfaction	3	7	10
Shame	3	7	10
Concern for others	2	7	9
Rejection	4	5	9
Self-confidence/independence	5	4	9
Interesting to recall	5	4	9
Security	6	3	9
TOTALS	182	199	381
Number of Memories	306	327	633
Mean no. of emotions per memory	1.68	1.64	difference 2.2%

Correlation tests between birth - 8 and 9 - 18 show an extremely low level of correlation (R = 0.07). In other words, the incidence of categories of personal meaning differ with age of encoding Table 4.3 11.2 shows that, whereas 6 of the top 10 are common to both encoding age periods, 3 of the top 4 (Family Togetherness, Nostalgia and Fear of Physical Harm) for the age group 0 - 8 do not appear in the top 10 for 9 - 18, and the top category for age 9 - 18 (Achievements) is not in the top 10 for 0 - 8. However, the top 10 for each of the age spans does contain 6 common categories.

4.4 Discussion: Study 1

This study yielded a detailed analysis of the nature of childhood memories. In accordance with the hypothesis that these memories would retain their vividness and their emotional impact in later life, the study examined the content of 633 childhood memories and assessed the qualities of the memories in relation to subject age and to the age of which the memories were originally encoded.

Two findings were unexpected in the light of previous research. First, is the fact that 90 out of 109 'ordinary' people (83%) could remember personal events before the age of 3. This contrasts with most earlier research which tended to regard memories before 36 months as unusual rather than normal (see, for example, Sheingold & Tenney, 1982).

Opinions as to how early autobiographical memory starts in childhood have shifted substantially during recent years, in step with growing evidence of very early memories. Thus, years ago, Freud (1905), Waldfogel (1948), Klein (1972), Tulving (1972) all believed that there is little or no autobiographical memory retrievable from younger than about 7 years old. In contrast, more recently Forbes (1988) reports evidence of episodic recall in a two-year old, and Fivush, Gray and Fromhoff (1987) published "Two-year old's talk about the past." However, unlike the memories reported in the present study, it is not known how long the early memories reported by Forbes, Fivush et al persist in later life. The present study shows they not only can, but very often do. The ability to remember, throughout one's life, the adaptively useful lessons learnt from early experience clearly has adaptive value. Hence, the retention of childhood memories into extreme old age provides evidence of a persistent adaptive function for childhood memories.

Another unusual finding in Study 1 concerns imagery. Brewer (1986) describes autobiographical memory as "image based", and later (1988) he empirically showed a positive correlation between strength of imaging and veridicality. While the present study confirms the importance of imaging no relationship to veridicality was investigated. Subjects reported imaging 77% of their memories. Yet more than 1 in 6 subjects claimed even when challenged, sometimes to recall vividly with little or no imaging. These subjects claimed 'to re-experience' the event.

In an effort to gain further understanding they were asked: "In a nutshell, what does this memory mean to you?" Their replies are quoted verbatim, together with conjectured explanations. A noteworthy absence of imaging was also found by Nigro and Neisser (1983) when a substantial proportion of their subjects denied using either a 'field' or 'observer' imaging in their recalls.

S. sex	S. age	Encoding age
F	75	17

TOPIC: Brilliant school results after coaching by two private tutors.

PERSONAL MEANING: "Achievement".

CONJECTURE: There is no one specific event for sensory imaging. The subject only claimed to remember *that* it happened Yet, after nearly 60 years, she still retained enough feeling about her experience at age 14 to bring the memory to mind in free recall.

S. sex	S. age	Encoding age
M	68	11

TOPIC: A motorist, out of a side road, crashed into their car.

PERSONAL MEANING: "Watch out for dangerous driving".

CONJECTURE: No sensory recall of the actual crash, and very poor recall of immediately after, strongly suggests traumatic amnesia. However, recall *that* it happened is clearly strong enough for the memory to have surfaced in unprompted free recall, and to evoke an echo of anxiety.

S. sex	S. age	Encoding age
M	78	12

TOPIC: Learning his brother had been fatally injured while cycling.

PERSONAL MEANING: "Sorrow at loss of brother".

CONJECTURE: The sad news, first of serious injury, and then death, was acquired in several stages, involving different people and surroundings. Within this composite diversity, specific sensory details would have been meaningless, compared with the acute common denominator of sorrow. Consequently perhaps only the powerful feeling was encoded, and not any environmental features.

S. sex	S. age	Encoding age
M	58	4

TOPIC: Rage at Nanny for buying him a two-penny Mars bar instead of the one-penny Milky Way he had sent her to buy with his six-pence pocket money.

PERSONAL MEANING: "People don't do as they're asked!"

CONJECTURE: As common idiom so aptly puts it, he was 'blinded with rage'. In other words, his attention was so absorbed by his feelings that awareness of the environment was greatly diminished. Environment was, indeed meaningless, since the emotional experience in no way depended upon it, and could have occurred anywhere.

S. sex	S. age	Encoding age
M	55	5

TOPIC: Digging for bait with two other little boys on sandy beach in front of their home in Gibraltar.

PERSONAL MEANING: "Nostalgic childhood memory"

CONJECTURE: Probably an often repeated event. Sensory imaging is necessarily particular to a specific image in the mind. Feelings can be, and usually are, more broadly based. So, when repetition generalises the memory of similar events, sensory imaging may decline, while feelings may even be cumulatively enhanced.

S. sex	S. age	Encoding age
M	38	2½

TOPIC: Hearing the crying of a close friend, a little boy on their first day at infant school, while the subject, himself, was happy to be there.

PERSONAL MEANING: "Wanting to go forward, while someone linked to you is holding back".

CONJECTURE: This subject said: "I re-experience the feeling. I experience his crying, rather than hearing sound". It could be that the most powerful of the imaging senses, namely vision, was simply not available for encoding. If he could not see, but only hear his little friend, it is feasible that the strong feeling of distress evoked could dominate the entire encoding of the event. It evidently did, to the extent of masking recall of the sensory sound input.

S. sex	S. age	Encoding age
F	45	2½

TOPIC: Sheltering with family in darkened air-raid basement.

PERSONAL MEANING: "Excitement".

CONJECTURE: The sense of vision was denied by darkness. Again, as with the previous subject, the absence of the most powerful of the senses enabled strong feelings to eclipse the weakened range of sensory imaging.

S. sex	S. age	Encoding age
F	75	14

TOPIC: Changed schools and made better progress.

PERSONAL MEANING: "The start of a better chapter".

CONJECTURE: An historical statement rather than a single, discrete event that could be specifically imaged. As with subject 54, this is a case of remembering *that* it happened, without remembering the actual happening.

In most of these examples, the absence of visual imagery can be explained because the memory is a generic one rather than a specific one. Nevertheless, such memories can still be rated highly for clarity and emotionality.

The topic areas we remember best (Section 4.3.2) appear to be those in which our personal interest and the intensity of what Neisser has called our 'private' feelings

were at their strongest at the time of the event and still evoke a powerful echo at recall. This is particularly apparent in early childhood memories, where cosy family togetherness is, not surprisingly, more meaningful than any events of global importance that may have been occurring at the time. Thus, for a child, the death of a much-loved family pet would be more memorable than the assassination of a President. At the other end of the age range, 80 plus, a similarly important role for self-involvement is mirrored in the predominance of Family as topic area of recall. In general, the topics that are reported most frequently are clearly related to the construction of a self-history and self-concept as suggested by Fitzgerald (1988). The findings in this Study regarding topic areas are not readily comparable with those reported by other researchers. Research in this field has usually been concerned more with the distribution of memories across a subject's life-span than with the topic of recall. Studies have also often used highly untypical subject samples of college students or personnel, and have not stipulated specific encoding age periods.

Subject age, both at encoding and at recall, has a marked influence on what is remembered. Recall of trivia is very much more frequent in the younger encoding years and there is a steep trend for this category to diminish in later childhood and adolescence. Family centred events are encoded twice more frequently between birth and 8 than between 9 and 18. It has been found by several researchers that old people tend to recall disproportionately more memories from childhood. For example McCormack (1979) using a sample all aged over 72, found that more memories were recalled from the first quartile of encoding age than from any other. However, little attention has been paid to what sort of things are being recalled. The present study shows Schooling and Family Events are recalled more often by

women. Men recall more Childhood Adventures, and perhaps less predictably, more Trivia. Topic areas are discussed further in Chapter 7.

Most people rate their childhood memories as 'Vividly Clear'. Analysis shows a significant increase of vivid clarity related to encoding age, especially between the ages of 3 and 7. Overall, the later the period of childhood to which the memory belongs, the more vividly clear it will be. This is most evident after the onset of puberty and teenage, which suggests there may be a new and more intense awareness of experience at that time. Most recall in the present study involved visual imaging, irrespective of any other senses involved. Neither gender nor subject age affects this visual predominance. Memories encoded before age 6 are more likely to be monochromatic and static than those encoded later.

Of the other senses, the involvement of ones own voice shows a notable rise in step with encoding age. It is surmised that this need not reflect any biological difference, but more likely relates to the growing importance of the spoken words in step with the development of linguistic skill and comprehension.

The recall of Heat, Cold and Pain showed very little gender differences. There were slight trends showing that women recalled Heat more than men, while men were more prone to remember Cold. The recall of Pain is also slightly higher for men, and one might conjecture that nature provides habituation to minimise painful memories of such female activities as childbirth and menstruation. Such an ability to forget pain would clearly benefit adults and not children, but if it is innate then its effect could well precede adulthood. Smell, while showing no gender difference, unaccountably increased its imaged contribution with age.

Although subject age does not generally affect the incidence of senses involved in imaging, the imaging of one's own voice is considerably lower in the 80's decade and older than in the 20's. Two reasons, or a combination of both, could be surmised. Firstly, the elapse of far more time to forget the sound of one's own childhood voice, and secondly the fact that the timbre of the voice may have changed more between childhood and 80 than between childhood and the 20's. It is also possible that the difference is due to the fact that the upper registers of sound which characterise children's voices become less audible with age, even in normal hearing. This, however, seems a doubtful cause, for it would show a positive correlation between imaging and physical correspondence which appears absent for all other senses. It is interesting that, although sensory acuity declines with age, this does not appear to affect the sensory quality (other than for own voice) in the imagery of early memories. This, of course, need not indicate a dissociation between perception and memory imaging. The imaging concerned here is of perception as it was then, years ago, before ageing had impaired acuity. The indication is that sensory imagery depends on what was perceived at encoding, and is not affected subsequently by impairment of physical sensory organs.

Rating by subjects shows there is a great difference in vividness between the different senses that are components of the memory image, and this does not vary with encoding age and subject age. Visual imagery in memories was rated about twice as vivid as any other kind of imagery. Overall, women rated sensory vividness in their memories significantly higher than men. Vividness ratings across encoding ages support the findings of such developmental researchers as Piaget (1973), Cook (1970), Pillemer and White (1989) and showed a correlation between age of encoding and rated vividness with a discernible watershed at ages between 6 and 8, followed by one on a lesser scale at the onset of puberty.

A high level of vividness is, perhaps, only to be expected in free recall, for it would seem natural that the most vivid memories should come to mind. But results here show a positively overwhelming choice for maximum vividness rating.

The 'island' nature or lack of contextual coherence of memories was measured by asking whether the subject could recall what was happening immediately before and after the event described. Recall of before and after was poor at encoding ages below 5 and only improved slightly with age of encoding. These findings emphasise the selectivity of childhood memories which consist, for the most part, of isolated scenes that are not integrated into a narrative sequence of events.

The retention of emotions over the time between an event and recall is far from equal among the various categories of emotion. Predictably, such emotions as Surprise, Anxiety and Fear which are closely tied to the original event should disappear once the unknown future has become the familiar past. In fact, they never do entirely vanish, and surprisingly, in old age the loss of emotionality was less. This suggests that in old age childhood memories are relived with greater realism than when, at younger ages, life obscures any focus on the past by present activities and cares in line with the views of Salaman (1982). Most important for the hypotheses of this thesis was this finding that, although memories do lose some of the emotionality of the original experience, the intensity of the emotion that is retained does not diminish across the life span.

Although not formally analysed there were trends suggesting that, as well as age, gender is seen to play a part in the differential retention of emotions. Women

appear to retain more of the emotions they originally felt than men, particularly concerning memories before the age of 3 and the emotion of Jealousy at any encoding age. On the other hand women forget feelings of Frustration, Fear and Grief faster than men.

Our belief in the independent, first-hand nature of our recall is almost absolute across all encoding ages according to subjects' confidence levels in this study. Subjects strongly rejected the possibility that their memories were derived from secondary sources, such as photographs.

Statistical analysis shows that childhood memories are more frequently triggered by perceptual or emotional cues than by action or verbal cues. Usually the perceptual cues include something seen, heard, or both. The unlimited diversity of type of cue matches that of the memories which they trigger. Often the adult rememberer does not recognise the cue responsible for a particular recall. In the present study "I'm sure I don't know what made me think of that," was often spoken by subjects in some astonishment. Yet probably this should not be surprising. For, when one takes into account the high proportion of early childhood memories that adults class as Trivia, it follows that the appropriately associated cues might not be recognised.

When questioned about personal meaning of a memory subjects almost invariably responded by describing the affective quality. The personal meanings of childhood memories reported by subjects show many differences between the encoding age periods birth to 8 and 9 to 18. The list rank order is headed by 'Nostalgia' in one form or another. From the diversity of events recalled it is evident that 'Nostalgia'

depends less on what happened (often Trivia) than upon a generally warm feeling about lost childhood.

To summarise, let us look again at three main areas: factors that are affected by age of encoding, by gender and by subject age.

In contrast to earlier views of Childhood Amnesia which held that autobiographical memory does not start before age 4 or later, the present study found that 83% of the 109 subject sample could, without difficulty, recall and describe an event before the age of 3 when specifically invited to do so. Possible reasons for this difference are examined in the final discussion (Chapter 7).

A factor greatly influenced by the age of encoding is the incidence of various topic areas recalled and the personal meanings and affective quality of the memories - what was and still is felt about the event. Here, the developmental progression from infancy to adolescence accords with the findings of Piaget and his followers. It spans a range from almost total physical egocentricity to semantic and social understanding of the world around us. Gender, too, influences the incidence of various topic areas of recall. Women tend to recall School, Home and Family events more than men, who, on the other hand, remember more Childhood Adventure and Trivia. Women also rate their memories as more vivid than men do.

Subject age at recall inevitably plays a major role in the choice of what is remembered and what is felt about it. If one accepts that at all ages a determinant of remembering is personal meaning, then it follows that the topic areas of memories recalled during early childhood will differ from those recalled in adult

years. The choice of topics to recall will change to fulfil the changed functions of remembering as people grow older. It follows that the memories of a sample of subjects with a median age of 53 will differ from those of undergraduate students (e.g. Robinson, 1986). Such differences preclude comparisons.

In the present study an important finding is the small extent to which subject age, including old age, affects the reported vividness of recall. It appears that deterioration of the sensory organs due to ageing need not affect the sensory vividness in the imagery of memories. Perhaps this should not be surprising, for once the 'recording' is made it will not suffer if the microphone gets damaged. Subject age in relation to forgetting is investigated in Study 3 (Chapter 6).

Several findings in this study appear to support the hypotheses stated in the introduction. Firstly, to enable autobiographical memory to serve its fundamentally adaptive purpose, an early start would seem desirable, as soon as possible after the prior need of learning the procedural control of motor activities has been met. By the age of around thirty months most children have acquired sufficient procedural skills to allow them, with adaptive advantage, to start remembering the favourable or unfavourable aspects of events. In other words, to move on from learning only motor skills to learning from event experience. The present study confirms the early start of autobiographical memories at before age 3.

Secondly, our ability to retain vividness and emotionality in the recall of remembered events again suggests adaptive value. A lesson once learnt from experience, usually stays to remind us for life. Today medicine and health care have extended life expectancy far beyond the primeval norm.

This survey has fulfilled the purpose of allowing us to characterise the nature of childhood memories. It has shown the kind of topics that are remembered and highlighted the vividness of the memories; the predominance of visual imagery and the pervasive presence of an emotional component. Although these memories are usually detached from the context of occurrence, they nevertheless retain a high degree of realism. The hypothesis that childhood memories will include two components, the event and the associated affect, is clearly confirmed.

CHAPTER 5

STUDY 2

CUED RECALL OF CHILDHOOD MEMORIES

5.1 Introduction

The rationale behind using cued recall as a methodology rests on the assumption that all memories are triggered by cues, even though often we are not aware what the cue was that evoked a particular memory. By manipulating the type of cues, and noting the incidence, latency and characteristics of the response recalled, it is hoped to cast some light on the organisation of the memories in long term store.

When cued recall was devised by Galton towards the close of the last century, his initial method was randomly to scrutinise objects he encountered while walking, and mentally to examine what ideas they evoked. Later he used a list of seventy-five words to see what ideas they triggered. There is not really a great difference in method, for all the objects he had seen had names, and could thus be regarded as 'object words'. In today's adaptations of cued recall the aim is very similar. But instead of 'what kind of ideas', enquiry is usually directed to 'what kind of memories' in response to categorised word cues.

Today, cued recall is still widely used, following the adaptation and use of Galton's paradigm by Crovitz and Schiffmann (1974). A suitable choice of cue word types has enabled the exploration of different aspects of memory.

For example, Conway and Bekerian (1987) used cued recall to explore what determines the vividness in flashbulb memories. They found that qualitative characteristics recognised at the time of event, such as consequentiality, personal importance, surprise and emotional impact determine vividness at recall. Vividness is thus entirely decided at encoding (the encoding view, Brown and Kulik, 1977).

In contrast, Rubin and Kozin (1984), also using cued recall, concluded that Personal Importance, i.e. the degree to which an event is felt to be relevant to the 'self', is so paramount that the presence of other qualitative characteristics is of relatively minor importance. Pillemer (1984), also using cued recall, found that emotional involvement was the most reliable predictor of flashbulb vividness.

The present study uses the experimental method of cued recall to amplify the findings in Chapter 4, where numerous differences between early childhood memories and later memories emerged from the analysis. Qualitative and quantitative differences were found in relation to age of encoding, and there was also evidence that emotion is an important component. Because the experimental method of cued recall is more rigorous than the structured free recall used in Study 1, it is being applied here primarily to test whether age of encoding and emotionality affect the accessibility of memories as measured by retrieval time.

Previous studies by the present writer (unpublished) and by other researchers, inter alia Robinson (1976) and Conway (1989) have already established that emotion cue words produce slower retrieval than object or action words. In consequence of the above prior knowledge it was predicted that retrieval would be faster for object words, but, in the light of findings in Chapter 4, emotions would be seen to relate to many of the memories produced, irrespective of the type of cue prompt.

It was also predicted that the effects of cue type would vary with the age of encoding. This prediction arises from the findings that the emotional content of memories changed with age of encoding. (See Table 4.3.7.1.).

5.2 Method

5.2.1 Subject Sample

15 men and 15 women, with no psychological training or special interest took part in the study. They were all aged 39 to 60. and had a mean age of 48.3 years.

5.2.2 Design

The experimental design used is 2 x 2, related. The two independent variables were type of cue and age of encoding. Cue type was of two kinds: (1) emotion words and (2) object words. Age of encoding had two levels : birth to 8 and 10 to 18 (age 9 was omitted to show a clear break).

The effectiveness of the cue words was measured in relation to prompting memories within each of the two encoding age periods. The dimensions measured were drawn from those investigated in Study 1 (Chapter 4) in relation to ages of encoding. They were:

1. Incidence of recall
2. Response time
3. Detail (Who? Where? When?)
4. Vividness
5. Personal importance at the time of the event
6. Frequency of recall
7. Unusualness of the event at the time

8. Emotionality of the event at the time

5.2.3 Materials

32 small, identical cards were used. 16 bore an emotion word cue (8 happy and 8 unhappy), and 16 had object word cues.

List of cue words: Appendix B

Instructions to subjects: Appendix C

Questionnaire: Appendix D

5.2.4 Procedure

Subjects were seated comfortably with a small tray beside them on which 8 cards were spread out face downwards. They were told this research concerned the triggering of early memories, and that each card on the tray had a word printed on its face side which might or might not trigger a memory for them within the (defined) age period 0 - 8 years or 10 - 18 years. It was explained they would be asked to pick up a card at random and read the word aloud, at which point a stop-watch would be started. Speed of recall would be measured. Immediately a memory in the appropriate age period came to mind, they should say "Yes", and the triggering time would be noted. If no memory came to mind within 30 seconds they would be asked to pick up another card.

They were then given a blank questionnaire and a run-through of the questions. It was explained that the description of the event could be very brief; just enough to establish it as an event that involved active or passive participation on their part. The mere imaging of a scene or an object, however vividly, would not serve as an event for our purpose.

Subjects were asked to take special care to include only what they actually remember, and not what today they know was, or must have been the case. Thus, "Who was there?" should include only those whose presence they really do recall as part of the event. "Where?" should evoke specific imagery and not just historical knowledge. "When?" should concern actual awareness of a time dimension as part of the event, that is awareness of the time of day, of a special day etc., not just a calculated year date or their age.

Regarding the rating scale for importance, unusualness and emotionality of the event, it was stressed that the rating should reflect "at the time it happened" and not now. Subjects were reminded during their interviews to be sure and observe the above criteria. For the sake of speed and legibility, all questionnaires were filled in on behalf of the subjects from their spoken answers.

To safeguard against the possibility that some cue words might be inherently better or worse than others at triggering memories, the sets of 16 emotion cue words and 16 object cue words were each sub-divided into 2 sets of 8. The resulting 4 sets were exposed in rotation across the encoding age periods. Individual cue words within each set were exposed in random order.

To counteract possible learning and/or fatigue bias, 15 subjects were asked to recall memories from the 10–18 encoding age group first, and the other 15 subjects started with the 0–8 age group. The cue words and the order of presentation are given in Appendix B.

5.3 Results

NOTE:

Wherever comparative performance is shown as a percentage difference (e.g. A is x% larger/smaller, faster/slower than B) the usual convention is consistently followed of treating B as the base figure and calculating $\frac{A - B}{B} \times 100$.

5.3.1 Incidence Of Recall

By cue type: There was virtually no difference in the incidence of recall triggered by emotion and object cue words (70.0% and 70.8% respectively).

By encoding age: The 10–18 encoding age period produced 5.6% more memories than the 0–8 group (347 and 329).

Failure to recall an event within the 30 sec. time limit occurred 13.5% more often in the 0–8 encoding age group than in that of 10–18 (151 and 133). A two way ANOVA, related design, with Cue Type and Encoding Age as variables yielded no significant effects, F>1 for both variables.

Table 5.3.1.1 Memories Recalled Within 30 Seconds

	Emotion	Object	Both
0 - 8	163 (max 240)	166 (max 240)	329 (max 480)
10 - 18	173 (max 240)	174 (max 240)	347 (max 480)
Both	336 (max 480)	340 (max 480)	

5.3.2 Latency Of Recall (Unadjusted)

Response time, i.e. time in secs. between exposure to cue word and triggering of memory are shown in Table 5.3.2.1.

Object cue words prompted recall 31.2% faster than emotion cue words (9.5 and 13.8 secs. means).

Memories from the 0–8 encoding age group were prompted 9.8% faster than those from the 10–18 group (11.0 and 12.2 secs means).

This suggests that across encoding age periods the speed of response and incidence of recall are unrelated, since the slower 10–18 encoding age period produced 5.6% more memories than the faster 0–8 group (see Incidence table).

A 2 x 2 within subjects ANOVA was used to examine the latency data. The first factor was cue type which had two levels: emotion and object. The second factor was age of encoding which had two levels: at 0-9 and 10-18. The dependent variable was reaction time. A reliable effect of emotion/object was observed, $F(1,29) = 45.702$, $MSe = 1.085$, $p<0.01$. Mean reaction times were 13.8 seconds for emotion and 9.5 seconds for object cues. This shows that memories were retrieved faster for object cues. A reliable main effect of encoding period was also observed, $F(1,29) = 4.645$, $MSe = 0.08$, $p<0.05$. Mean reaction times for the 0-9 age group were 11.0 seconds and 12.2 seconds for the 10-18 age group. This demonstrates that earlier memories were retrieved faster. No interaction was observed, $F<2.5$.

Table 5.3.2.1

Mean time in seconds between exposure to cue word and triggering of memory

Age at encoding	Type of cue words		
	Emotion	Object	Difference
0–8	13.5	8.6	4.9
10–18	14.2	10.3	3.9
Both age periods	13.8	9.5	4.3

5.3.2a Adjusted Latency Scores

Adjusted scores include 30 secs. unproductive search time for each failure to produce a memory within the 30 sec. time limit. Thus, adjusted figures take account of the varying incidence of recall or failure within the two conditions.

Without such adjustment, a condition that produced 7 out of 8 failures and only 1 memory, albeit rapidly triggered, would appear superior to one that produced 8 out of 8 memories, though triggered, on average, a little slower. Adjusted scores are shown in Table 5.3.2a.1.

By cue type

Despite the 'flattening' effect of the adjustment, object word cues are still seen to trigger recall 17.1% faster than emotion words cues (unadjusted 31.2%).

By encoding age

A two-way related analysis of variance (cue type x age period) - see Appendix G - was carried out on the adjusted response times. The effect of cue type was significant ($F = 23.28$, df 1, 29, $p<.001$) showing that memories were retrieved faster and more efficiently for object clues than for emotion cues. There was no effect of age period ($F<1$) and no interaction between cue type and age period.

Table 5.3.2a.1 Adjusted Mean Latency Of Recall

Mean adjusted time in seconds between exposure to cue word and triggering of memory

Age at encoding	Type of cue words		
	Emotion	Object	Difference
0–8	18.8	15.2	3.6
10–18	18.6	15.7	2.9
Both age periods	18.7	15.5	3.2

5.3.3 Memory Details - Who Was There?

Table 5.3.3.1 shows that there was no significant difference in recall of information about 'Who' between cue types or age periods.

Almost all recall included remembering who, besides the subject, was crucially present at the event, though there was sometimes uncertainty as to who else might have been there.

Table 5.3.3.1 Who Was There?

Percentage of subjects remembering who was present at the event

Age at encoding	Type of cue words		
	Emotion	Object	Both cue types
0–8	98.8%	97.0%	97.9%
10–18	98.8%	99.4%	99.1%
Both age periods	98.8%	98.2%	98.5%

Where Was This?

Almost all recall included remembering the general location of the event, e.g. "at my grandmother's house".

Sometimes location and imagery were much more precise, e g. "sitting at the scrubbed table in our kitchen". However, the questionnaire does not provide for qualitative distinctions, so any definite recall of general location was rated as positive. As Table 5.3.3.2 shows there were no significant effects of cue type or age of encoding.

Table 5.3.3.2 Where Was This?

Percentage of subjects remembering general location of event

Age at encoding	Type of cue words		
	Emotion	Object	Both cue types
0–8	98.8%	98.2%	98.5%
10–18	100.0%	100.0%	100.0%
Both age periods	99.4%	99.1%	99.3%

When Was This?

Table 5.3.3.3 shows the percentage of subjects who were able to report when the memory occurred, time of day, specific day, etc.

By cue type

Recall of "when" was 11.7% higher in memories triggered by emotion word cues than by object words (71.4% as against 59.7%).

By encoding age

Memories encoded in the 10–18 age group included 34.7% more 'when" recall than those encoded before age 9 (74.9% as against 55.6%).

Table 5.3.3.3 When Was This?

Percentage of subjects remembering when event occurred

Age at encoding	Type of cue words		
	Emotion	Object	Difference
0–8	61.4%	50.0%	11.4%
10–18	80.9%	69.0%	11.9%
Both age periods	71.2%	59.5%	11.7%

Differences in age of encoding and in cue type were significant by Z tests ($p < 0.05$).

5.3.4 Memory Vividness

Vividness was rated on a 5 point scale, where 1 meant not at all and 5 meant extremely. Ratings are shown in Table 5.3.4.1. No reliable differences were observed.

Table 5.3.4.1 Vividness Rating

Mean rating of vividness by subjects (out of 5).

Age at encoding	Type of cue words		
	Emotion	Object	Difference
0–8	3.67	3.66	0.01
10–18	3.71	3.78	0.07
Both age periods	3.69	3.72	0.03

5.3.5 Memory Importance

Memory importance to self at the time of the event was rated on a 1-5 scale, where 1 meant not at all and 5 meant extremely. The ratings are shown in Table 5.3.5.1. Events recalled via emotion cue words had 16.2% higher "importance" rating than those prompted by object words.

A two factor within subjects ANOVA was used to examine the data on personal importance of memories. The first factor was cue type which had two levels: emotion and object. The second factor was age of encoding which had two levels: at 0-8 and 10-18. The dependent variable was mean personal importance scores. A reliable effect of emotion/object was observed. $F(1,29) = 62.838$, $MSe = 9.83$, $p<0.01$. Mean personal importance ratings were 4.03 for emotion and 3.46 for object. This shows that memories retrieved to emotion cues are significantly more personally important than memories retrieved to object cues. No main effect of age of encoding period was observed, $F<1$. No interaction was observed, $F<3$. These findings show that early childhood and later childhood memories do not differ in importance.

Table 5.3.5.1 Importance Rating

Mean rating of importance to self at the time by subjects (out of 5).

Age at encoding	Type of cue words		
	Emotion	Object	Difference
0–8	3.92	3.43	0.49
10–18	4.12	3.49	0.63
Both age periods	4.02	3.46	0.56

5.3.6 Frequency Of Recall

Frequency of recall was rated on a 1-5 scale where almost never = 1 and very often = 5. The ratings are shown in Table 5.3.6.1.

Frequency of recall was rated 10.0% higher for memories triggered by emotion cue words than for those triggered by object words.

A two factor within subjects ANOVA was used to examine the data on frequency of recall. The first factor was cue type which had two levels: emotion and object. The second factor was age of encoding which had two levels: at 0-8 and 10-18. The dependent variable was mean frequency scores. A reliable effect of emotion/object was observed, $F(1\ 29) = 9.006$, MSe = 1.21, $p<0.01$. Mean frequency ratings were 2.10 for emotion and 1.91 for object. This shows that memories retrieved to emotion cues were rated as more frequently recalled. No main effect of encoding period was observed, $F<1$. No interaction was observed, $F<3$. These findings show that memories from early childhood and from later childhood did not differ in frequency of recall.

Table 5.3.6.1 Frequency Of Recall

Mean rating of frequency of recall by subjects (out of 5).

Age at encoding	Type of cue words		
	Emotion	Object	Difference
0–8	2.01	1.91	0.10
10–18	2.18	1.91	0.27
Both age periods	2.10	1.91	0.19

5.3.8 Emotionality

Emotionality, i.e. how emotionally arousing was the event at the time was rated on 1–5 scale, where 1 meant not at all and 5 meant extremely

Events recalled via emotion cue words were rated 21.8% more emotionally arousing at the time of occurrence than those triggered by object cue words.

A two factor within subjects ANOVA was used to examine the data on emotionality. The first factor was cue type which had two levels: emotion and object. The second factor was age of encoding which had two levels: at 0-8 and 10-18. The dependent variable was mean emotion scores. A reliable effect of emotion/object was observed. $F(1.29) = 54.848$, $MSe = 17.272$, $p<0.01$. Mean emotion ratings were 3.97 for emotion and 3.25 for object. This shows that memories retrieved to emotion words were rated more emotional. No main effect of encoding period was observed, $F<1$. No interaction was observed, $F<2.5$. These findings show there was no difference in the emotionality of memories retrieved from the 0-8 period and the 10-18 period.

Table 5.3.8.1 Emotionality

Mean rating of how emotionally arousing event was at the time by subjects (out of 5)

Age at encoding	Type of cue words		
	Emotion	Object	Difference
0–8	3.88	3.34	0.54
10–18	4.06	3.19	0.87
Both age periods	3.97	3.26	0.71

The data from all the dependent measures is summarised in Table 5.3.9.1.

5.3.7 How Unusual Was It?

(Unusualness at the time of the event was rated on a 1-5 scale: 'Often happened' scored 1 and 'First time' scored 5. Whether the event was unique is not known).

Events recalled via emotional cue words were rated 9.7% more unusual at the time than those triggered by object cue words.

Events encoded between the ages of 10–18 were rated 3.0% more unusual at the time of occurrence than those encoded in the 0–8 period.

Table 5.3.7.1 How Unusual Was It?

Mean rating of unusualness at the time by subjects (out of 5)

Age at encoding	Type of cue words		
	Emotion	Object	Difference
0–8	4.21	3.87	0.34
10–18	4.37	3.94	0.43
Both age periods	4.29	3.91	0.38

A two factor within subjects ANOVA was used to examine the data on unusualness. The first factor was cue type which had two levels: emotion and object. The second factor was age of encoding which had two levels: at 0-8 and 10-18. The dependent variable was mean unusual scores. A reliable effect of emotion/object was observed, $F(1\ 29) = 16.031$, $MSe = 5.199$, $p<0.01$ Mean unusual ratings were 4.29 for emotion and 3.91 for object. This shows that memories retrieved to emotion cues were rated as more unusual. No main effect of encoding period was observed, $F<1$. No interaction was observed, $F<3$ These findings show that memories from early and later childhood did not differ in unusualness.

5.3.8 Emotionality

Emotionality, i.e. how emotionally arousing was the event at the time was rated on 1–5 scale, where 1 meant not at all and 5 meant extremely

Events recalled via emotion cue words were rated 21.8% more emotionally arousing at the time of occurrence than those triggered by object cue words.

A two factor within subjects ANOVA was used to examine the data on emotionality The first factor was cue type which had two levels: emotion and object. The second factor was age of encoding which had two levels: at 0-8 and 10-18. The dependent variable was mean emotion scores. A reliable effect of emotion/object was observed. $F(1.29) = 54.848$, $MSe = 17.272$, $p<0.01$. Mean emotion ratings were 3.97 for emotion and 3.25 for object. This shows that memories retrieved to emotion words were rated more emotional. No main effect of encoding period was observed, $F<1$. No interaction was observed, $F<2.5$. These findings show there was no difference in the emotionality of memories retrieved from the 0-8 period and the 10-18 period.

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Both age periods	3.97	3.26	0.71

The data from all the dependent measures is summarised in Table 5.3.9.1.

5.3.9 Summary Of Results

Table 5.3.9.1

	Total	% or mean	Total	% or mean
	0–8 Emotion cues		0–8 Object cues	
Recalls (max. 240)	163	67.9%	166	69.2%
Failures to recall	77	32.1%	74	30.8%
Prompt time in secs.	2200.8	13.5	1428.0	8.6
Prompt time + 30 secs per failure	4510.8	18.8	3648.0	15.2
Who was there?	161	98.8%	161	97.0%
Where was this?	161	98.8%	163	98.2%
When was this?	100	61.4%	83	50.0%
Vividness (1–5 scale)	598	3.67	607	3.66
Importance (1–5 scale)	639	3.92	569	3.43
Frequency of recall (1–5 scale)	328	2.01	317	1.91
Unusualness (1–5 scale)	686	4.21	643	3.87
Emotionality (1–5 scale)	632	3.88	554	3.34
	10–18 Emotion cues		10–18 Object cues	
Recalls (max. 240)	173	72.1%	174	72.5%
Failures to recall	67	27.9%	66	27.5%
Prompt time in secs.	2448.4	14.2	1795.6	10.3
Prompt time + 30 secs per failure	4458.4	18.6	3775.6	15.7
Who was there?	171	98.8%	173	99.4%
Where was this?	173	100.0%	174	100.0%
When was this?	140	80.9%	120	69.9%
Vividness (1–5 scale)	641	3.71	657	3.78
Importance (1–5 scale)	713	4.12	608	3.49
Frequency of recall (1–5 scale)	377	2.16	332	1.91
Unusualness (1–5 scale)	756	4.37	686	3.94
Emotionality (1–5 scale)	702	4.06	555	3.19

To summarise these findings, this study has shown that object cued memories come to mind faster, but emotion cued memories are more important, more unusual, more emotional and more frequently recalled.

5.3.10 Correlation Of Memory Attributes

Table 5.3.10.1 Correlations Of Memory Attributes

	Vivid.	Import.	Freq.	Unusual.	Emotion.
Vividness	1.00	-	-	-	-
Importance	0.29**	1.00	-	-	-
Recall Frequency	0.47**	0.31**	1.00	-	-
Unusualness	0.05	0.28**	0.07	1.00	-
Emotionality	0.26**	0.71**	0.26**	0.39**	1.0

Key: **Significant at 0.01.

NOTE: There are no correlations significant at 0.05 that are not also significant at 0.01. With 675 observations, Pearson correlation critical values for one-tailed test are: for $p<0.05$, 0.1638 and for $p<0.01$, 0.2301. Table 5.3.10.1 shows Pearson positive correlations, all at significance level of $p<0.01$ between:

Importance and Vividness

Recall Frequency and Vividness and Importance

Unusualness and Importance

Emotionality and Vividness, Importance, Frequency of Recall and Unusualness

5.3.11 Memory Topics

The categoric labels in Table 5.3.11.1 were initially generated by concensus among three independent judges after scrutiny of the 633 free recall memories in Study 1. They were found, by the same judges, to accommodate all of the 676 memories evoked by cued recall in Study 2. The ranked incidence of different memory topics is shown in Table 5.3.11.1 and similar data obtained from free recall in Study 1 is also listed for comparison.

Table 5.3.11.1 Memory Topics: Cued Recall Compared With Free Recall (Study 1)

	CUED RECALL		FREE RECALL
1.	School	1.	School
2.	Trivia	2.	Trivia
3.	Family & family occasions	3.	Illness, injury, hospital
4.	Achievement, exams, prizes, etc.	4.	Family & family occasions
5.	Holidays	5.	Adventure (deliberately sought)
6.	War and/National Service	6.	War and/National Service
7.	Adventure (deliberately sought)	7.	Achievement, exams, prizes, etc.
7.	Catastrophies, fires, accidents	8.	Holidays
9.	Births, deaths, marriages	8.	Births, deaths, marriages
9.	Pets	10.	Work, jobs, careers
11.	Friends & social occasions	11.	Sport
12.	Birthdays, anniversaries, etc.	12.	Friends & social occasions
13.	Illness, injury, hospitals	13.	Love, romance, sex
13.	Sport	14.	Spectacles, theatre, cinema, etc.
15.	Home, moving, furnishing, etc.	15.	Home, moving, furnishing, etc.
16.	Love, romance, sex	16.	Religious events, confirmations

16. Spectacles, theatre, cinema, etc.

17. Catastrophies, fires, accidents

18. Work, jobs, careers

17. Pets

18. Religious events, confirmations

19. Birthdays, anniversaries, etc.

20. -

20. V.I.P.s meeting famous people

5.4 Discussion Study 2

Results in this study of cued recall showed that:

1. The incidence of memories evoked did not vary with age of encoding or by cue type.

2. The latency of recall was significantly faster for object words cues than for emotion words. This accords with the findings of other researchers, inter alia Robinson (1975) and Conway (1989). Latency was also faster for memories encoded between birth and 8 than for those encoded between 10 and 18.

3. Adjusted scores (which add 30 seconds unproductive search time when no memory was evoked) favoured object word cues, but showed no effect related to age of encoding.

4. There was no significant difference in the recall of Who? or Where? between cue type or encoding age, but When? responded better to emotion cues.

5. Vividness of memories was unaffected by age of encoding or by type of cue.

6. Events recalled by emotion cue words were rated as more important than those in response to object words. Encoding age did not affect rated importance.

7. Memories cued by emotion words were more frequently recalled. Frequency of recall was unaffected by age of encoding.

8. Emotion cued memories were rated as more unusual. Unusualness rating was unaffected by age of encoding.

9. Events recalled by emotion cue words were rated as more emotional at the time of the event. Emotionality was unaffected by age of encoding.

The relatively poor recall of WHEN? compared with WHO? and WHERE? in relation to an event accords with the established view that the dating of a memory is almost always inferential. However, according to Wagenaar (1986) in composite or multiple cueing, which he found to be the most effective, the addition of WHEN? provides specificity which considerably aids recall.

It is not possible to give a simple, clear-cut answer to the question : what kind of cues trigger childhood memories? The point was made in Study I that for any individual person, the cue that triggered a particular memory is likely to be as esoteric as the memory it brought to mind. Salaman (1982) quotes examples from memories of Chateaubriand and de Quincy, as well as from her own experience, in which cueing apparently consists of some environmental or emotional resemblance to that which prevailed at a childhood event.

Grouping cue types into convenient categories for analysis as in the previous Study I offers only limited help, for cue types are far from mutually exclusive and usually occur simultaneously, e.g. something seen is also often heard and is inseparable

from some particular kind of activity. No such concurrence can cloud the issue in Study 2, where object word cues and emotion word cues were presented separately. In Study 1 perceptual cues were reported to be most effective. Perceptual cues are probably more or less synonymous with object cues but Study 1 did not reveal any differences between perceptual and emotion cues. This lack of difference stems from the less powerful methodology.

Two aspects of the findings in this Study were unexpected. Firstly, although earlier memories were retrieved faster, there was no effect of age of encoding on any of the rated memory characteristics. Memory quality does not appear to vary with encoding age. This finding contrasts with some of the results in Chapter 4, where age of encoding differences were found. This is probably due to the fact that, in this Study, age of encoding was grossly partitioned into only two periods. The second unexpected finding was, although object cued memories were more accessible, they were, paradoxically, rated as less important, less unusual, less emotional and less frequently recalled. Clearly, accessibility is related to these other characteristics.

Why, one might ask, are object cues so powerful? Especially since, as seen in table 5.3.8.1 the rating for Emotionality is high (3 out of max. 5) even for memories evoked by object cue words? The answer conjectured here is that object cues are more specific than emotion cues in the imagery of memory As Brewer (1986) has written, and the present Study 1 (Chapter 4) confirms, autobiographical memory usually involves imagery. Objects can be immediately imaged; abstract emotions cannot. An emotion word is applicable to an unspecified diversity of situations and so involves the search of an indefinite range of experiences to find an experience that fits. Hence, response to emotion cues take longer.

Why, one might also ask, should Emotionality often be rated so highly in memories triggered by object words? Probably because even a highly emotional experience must have had an objective environment, and there is evidently no reason why an associated object should not provide access. As Robinson (1980) found; it is intensity of emotion at the event that predicts memory availablity. The high emotional rating for memories triggered not only by emotion word cues but also by object words lends further support to the hypothesis that all autobiographical memory must, as an adaptive necessity, have an affect component.

Table 5.3.4.1 shows no significant difference in subjects' ratings for Vividness between cue types or encoding ages. This contrasts with a steep increase in the ratings for Vividness of Sensory Imagery by encoding age in Chapter 4 (Table 4.3.5.1). It was noted in Chapter 4 that subjects sometimes distinguish between the concepts of Clarity and Vividness. The former can be interpreted as unclouded visual imagery, and is usually acknowledged by subjects to be greater with older encoding age. On the other hand, the experience of Vividness can, on occasion, be powerful enough to produce high vividness rating for a memory that has little or no imaging at all. (See Chapter 4 Section 4.3.5). The question: "How vivid is this memory?" has, on occasion, been answered: "Oh, extremely vivid. I still remember very vividly how I felt," even though the detailed imagery reported was minimal. Evidently many subjects in Study 2 are rating vividness in this holistic perspective. The absence of any encoding age influence on their vividness ratings suggests the presence of an emotional content powerful enough to negate the influence of poorer imagery in the younger age period. This surmise is corroborated by the fact that when emotionality is deliberately excluded, as with

rating the involvement of purely exogenous senses, the steep bias in favour of higher age of encoding is present (see Chapter 4 Table 4.3 5.1).

To what extent do topic areas evoked by cued recall differ from those that emerge in free recall? The ranked incidence of different memory topics is shown in Table 5.3.11.1 and similar data obtained from free recall in Study 1 is also listed for comparison. It is interesting that, while no new topics emerged, there is some re-arrangement in the rank order of categoric incidence. For example, Illness,. Injury, Hospital, which occupies 3rd place in free recall rank order moves down 10 places to 13th for cued recall. On the other hand, Castastrophes, Fire, Accidents near the bottom at 17th in free recall moves up 10 places to 7th in cued recall. Otherwise, with the exception of Pets which rises 8 ranks in cued recall (doubtless because Pet is one of the object cue words) all other catergories stay within 3 ranks of each other on their 20 step respective ladders. On balance, then, it is the similarity rather than the differences in the topic incidence of cued or free recall memories that is evident. It seems access to the content of long-term memory is not narrowly dependent on the method of cueing. Actually there may not be so much difference in method between the free recall of Study 1 and the cued recall used here. Subjects in the free recall Study reported that the most frequently effective form of cueing was perceptual - hearing or seeing something. In cued recall thay are seeing words on cards. Galton made no distinction between seeing objects and reading object words, so perhaps we should not be surprised at the similarity of topic incidence.

In conclusion, although the findings of Study 2 revealed that emotion-cued memories are slower to access, they confirm the presence of an emotional

component even in object-cued memories and highlight the correlation of emotion with vividness, importance, unusualness and frequency of recall.

CHAPTER 6

STUDY 3

FORGETTING ACROSS THE LIFE SPAN

6.1 Introduction

The literature concerning autobiographical memory and ageing has tended to concentrate on the distribution of memories across the life span. The usual method used is cued recall, and the subject is asked to date the first discrete event that comes to mind in response to the prompt word. Results indicate the relative distribution of remembered events and their topic areas in different life periods. This can be taken as a general description of such research as that of Crovitz and Schiffman (1974), Robinson (1976) and Rubin (1982). All the above aimed primarily to establish a formula for the normal rate of forgetting, against which elderly performance could be compared. Their subject samples were usually young college undergraduates. However, some researchers did include older subjects in their sample, while McCormack (1979) used a sample entirly aged over 70. At the extreme, Paul Costa and Robert Kastenbaum (1967) investigated the memories of 187 American centenarians. However, it could be argued that what such research is measuring, using self-selected memories in cued recall among the elderly is really the distribution across life-periods of subjects' favourite reminiscenses rather than their ability to remember actual details of childhood experience. Other studies have used experimenter-designated memories to avoid this danger by requesting detailed recall of some specific event, such as the birth of a sibling (Sheingold and Tenney 1982).

Both in free recall and in more constrained paradigms, it was usually found that the best predictor of remembering was frequency of mental rehearsal. This was most marked among the oldest subjects. The influence of rehearsal among the very old was confirmed by the findings in a study by Cohen, Conway and Maylor (1994), in which two groups aged 18 - 55 and 64 - 84 were tested for detailed recall of the

circumstances in which they heard the news of Mrs Thatcher's resignation from premiership. Cohen et al found that whilst emotionality and surprise usually sufficed for retention among middle-aged subjects, for the older group retention of detail suffered if not frequently rehearsed. They also found that in the absence of rehearsal loss of detail in recall was often compensated for by generalising a memory or borrowing from relevant schemata.

The present Study 3 seeks to avoid generalisation or schemata-borrowing by confining enquiry strictly to: whether people are able to recall specific details that were undoubtedly known at the ages of 6 - 11, which, incidentally, are outside most estimates of childhood amnesia.

There is a clear distinction between not remembering and forgetting. In the former case, information may simply not have been encoded. In the latter case by definition, the information was encoded and has since been dimmed or extinguished over time. It is with this latter phenomenon that Study 3 is concerned. In practical terms this puts constraints on the topic area investigated in order to ensure, as far as possible, that all the subjects did encode the kind of experience about which they are asked to remember.

In this study, the topic chosen as likely to have been experienced most widely is schooling between the ages of six and eleven. Subjects' ability readily to recall memories from between these ages had been shown by findings in Study 1. At or before eleven it is usual to transfer from junior to senior school. Any subject who stayed on at junior school beyond the age of eleven, or whose senior school was housed in the same building was excluded from the sample, since they would have had extended encoding opportunities.

However, no matter how rigorous the temporal or other constraints, other factors may still influence recall. For instance, the amount of interest and, therefore, attention, that was being paid by various subjects to the chosen topic is likely to influence individuals' levels of recall. In this case, several subjects confessed they had paid little attention to school. There is also a more specific aspect of personal involvement.

Brown and Kulik (1977) listed the chief determinants of retention as surprise, emotionality and consequentiality. Rubin and Cozin (1984) posited personal significance, while Pillemer (1984) put emotionality in first place. The presence of such factors must depend, in part, on the topic area involved, as well as on the questions asked. They do not lend themselves equally to every topic. In the light of the above findings, those questions in the present questionnaire that enquire about inanimate objects and their topography, are not conducive to emotional arousal, and so, would be expected to lower the probability of recall.

Conversely, the frequency with which rosters and lists of names feature in school life, might well produce a higher than 'normal' retention rate for this category. In other words, had a different topic been chosen, the categoric rank order might have been different. Yet, for want of any ideal alternative, it is thought that early schooling provides a choice likely to be usefully indicative of trends in memory erosion as a function of memory age.

6.2 Method

6.2.1 Subjects

The 83 subjects participating in this study, 44 women and 39 men, were all from the 109 subjects who completed Study 1. The 26 who were excluded did not meet the criteria regarding a change of school in a different building by age 11. Ages of the 83 subjects ranged between 21 and 91. The ages of the memories recalled ranged between 11 and 82 years; mean memory age 41 years and median 39 years.

6.2.2 Materials

A standardised questionnaire with space to record subjects' answers. For the sake of speed and legibility, the researcher read out the questions and wrote down the answers. A specimen questionnaire with instructions to subjects is at Appendix E.

The questions were constructed on the basis of informal pilot testing and were designed to probe memory for information that (a) would have been known at the time and (b) could not easily be inferred or guessed.

6.2.3 Procedure

A structured interview technique was used. As in the first study of free recall, it was considered important to avoid an unfamiliar laboratory atmosphere and to make subjects feel 'at home' and relaxed. This was achieved by carrying straight on after Study 1 was finished, usually pausing only for a cup of tea or coffee. Subjects were 'eased' into this study with the following instructions:

> "Finally, I'd like you to think back again to when you were about 6–11 years old. I shall ask you some questions about your schooling at that time. But I shan't expect you to remember all the answers."

"So please try not to guess. Don't tell me what you think was probably the case – only what you *actually remember*. If you don't remember, just say so. But if you do remember, I'd like to know how definite the memory is. So for each answer I shall ask you whether you're (a) absolutely sure, or (b) fairly sure, or (c) not very sure."

6.3 Results

6.3.1 The Rate Of Forgetting

This is presented as a percentage loss per annum. Subjects were asked 20 questions about their schooling up to age 11. Positive answers were rated at three levels of confidence 3 for 'absolutely sure' or 'vividly', 2 for 'fairly sure' and 1 for 'not very sure'.

The resulting scores were then expressed as percentages of the maximum possible. Subtraction of the percentage score from the maximum 100% gave the total percentage eroded. This divided by the memory age is the percentage loss per annum as shown in Table 6.3.1.1 and Figure 6.3.1.1.

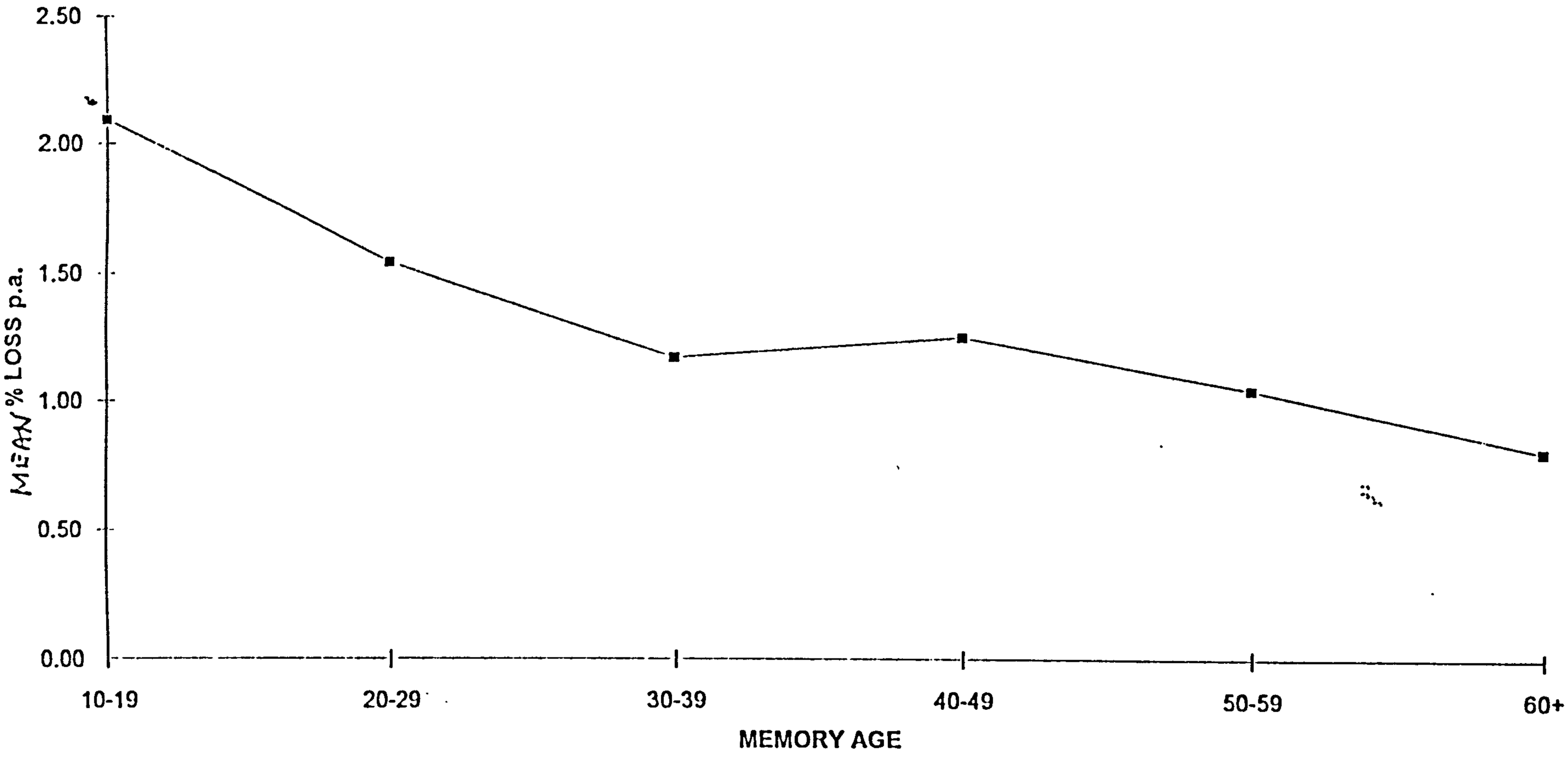
Catergorisation of responses was as follows: Things (e.g. desk or table? (q.13); benches or chairs? (q.15); clock? (q.16, 17, 18)) People (e.g teachers? (q. 2, 4, 10)). Names (e.g. names of teachers? (q. 2,4,7)). Visual (e.g. teachers apperance? (q. 3, 5, 8); colour of floor? (q. 12)). Aural (e.g. sound of teachers voices (q. 6, 9)). Topographical (e.g. seat in class? (q. 11); position of clock? (q. 17); where you lunched? (q. 19); where you hung your clothes? (q. 20)).

Table 6.3.1.1 Erosion Of Memory: % Loss Per Annum

Memory Age	Things	People	Visual	Aural	Names	Topographical	Mean
10–19	2.09	1.90	2.40	3.62	1.15	1.41	2.09
20–29	1.10	1.64	1.40	2.80	1.20	1.12	1.54
30–39	0.96	1.20	1.20	1.85	0.91	0.93	1.17
40–49	1.10	1.22	1.35	1.84	0.93	1.07	1.25
50–59	0.77	1.20	1.09	1.47	1.02	0.73	1.05
60+	0.63	0.87	0.86	1.20	0.72	0.56	0.81

FIG. 6.3.1.1

EROSION OF MEMORY: MEAN OF ALL CATEGORIES COMBINED



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6.3.2 Category Differences In The Rate Of Forgetting

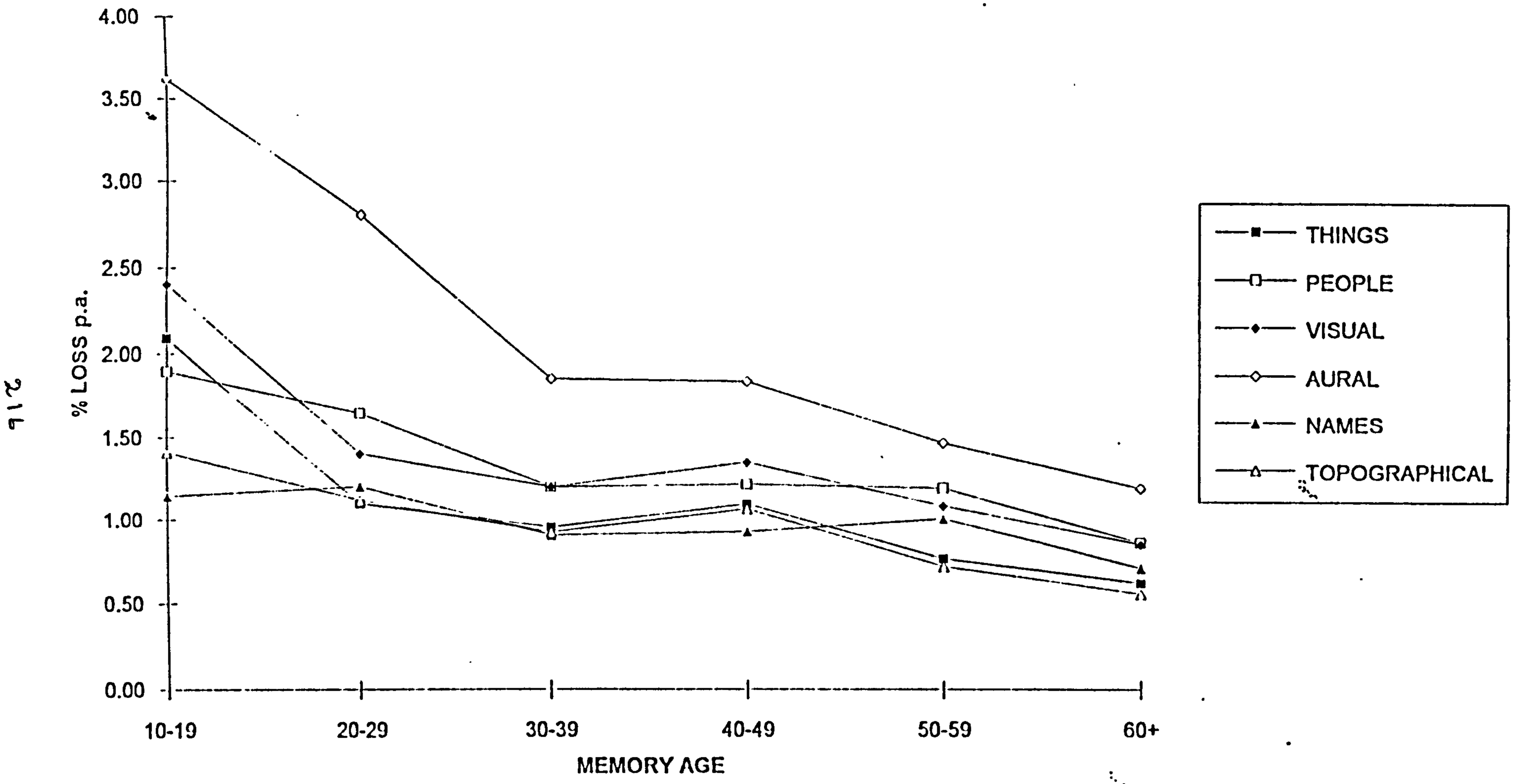
It will be seen from Table 6.3.2.1 and Fig 6.3.2.1 that there is a general trend for the rate of forgetting to be greater in the earlier years of memory and that after around age 40 forgetting levels off at a lower rate. The fact that erosion is highest for the aural, (i.e. sound of teacher's voices) category is in accord with the trend in Study 1 that recall of voice declined with subject age. There may also be a more specific reason. It will be seen from Table 6.3.2.1 and Fig 6.3.2.1 that retention of the aural category declines at a faster rate than other categories until the memory age of 30 - 39 and then remains more or less in step with other categories. However, a Chi square test comparing Visual and Aural categories for memory ages 10 - 39 versus 40 - 60+ showed no significant differences ($X^2 = 0.7$ n.s.). Unlike in Study 1, the sound here is of a particular teacher's voice and not voices or sounds in general. Most people between the ages of 20 and 40 hear more different voices, to cloud and confuse the memory of one particular, than they do in later life. But if the memory of a specific voice survives the period of 'maximal confusion' it will tend to join the other categories in the following the progressivcly slower rate of forgetting.

The remaining categories in Table 6.3.2.1 are open to confusion through frequent categoric duplication. For example, the recall of a person's voice or colour of hair must also mean recall of the person. Similarly recall of a person's name, in a school context, will imply recall of the person named. Conversely, it is intuitively obvious that it is possible to recall a teacher without remembering either name, sound of voice or colour of hair.

Table 6.3.2.1 therefore, takes account of each category, scored separately if remembered. Duplication is ignored, as it is also in Fig. 6.3.2.1.

FIG. 6.3.2.1

EROSION OF MEMORY



Scoring System

One mark for each remembered answer.

x 3 for "absolutely sure" or "vividly".

x 2 for "fairly sure" or "fairly clearly".

x 1 for "not very sure" or "vaguely".

Differences in life-style meant not all questions were applicable to all respondents. Total scores were, therefore, percentaged on applicable questions only. Any subject for whom fewer than ten questions were applicable was not included in the sample.

Table 6.3.2.1 Percentage of annual loss of clarity for each category

(averaged across years of retention)

BY % P.A. BY CATEGORY	
Aural	2.00
Visual	1.34
People	1.28
Things	1.07
Names	0.96
Topographical	0.95

6.3.3 Gender Differences In Rate Of Forgetting

It will be seen from Table 6.3.3.1 that women retain clearer recall of their early schooling environment than men. However, although the difference is greatest in visual recall all these differences are too small to be statistically significant.

Categoric order of erosion, however, remains the same, but at a consistently lower level than for men.

Table 6.3.3.1 Overall Erosion Of Detail By % P.A. By Gender

	MALE (n = 39) %	FEMALE (n = 44) %	difference
Aural	2.12	1.90	0.22
Visual	1.60	1.11	0.49
People	1.49	1.10	0.39
Things	1.19	0.97	0.22
Names	1.08	0.84	0.24
Topographical	1.04	0.87	0.17

6.3.4 Levels Of Confidence

Table 6.3.4.1 shows that, while there was slightly less confidence after the subject age of 60, the majority of subjects, including those aged over 60, felt 'absolutely sure' about the details they did remember. For the sixty subjects aged under 60, 50 questions out of 1,200 (4.2%) were not applicable. Within this age group 357 out of 1,150 applicable questions (31%) could not be answered. For the twenty-two subjects aged over 60, 24 questions out of 440 (5.5%) were not applicable and 173 out of 416 applicable questions (41.6%) could not be answered.

Table 6.3.4.1 Levels Of Confidence By Subject Age

Key: n = number of subjects in age group

a = absolutely sure

b = fairly sure

c = no very sure

0 = could not remember

Subject Age	No. of Memories given confid. ratings	% a	% b	% c	% 0
Under 60 n = 60	1150	50.6	11.3	7.1	31.0
Over 60 n = 22	416	46.9	5.5	6.0	41.6

By Chi square test the differences between the age groups are not significant, $X^2 = 3.36$, df3, $p < 0.3$.

6.4 Discussion

This Study has been described as unique in probing memory for specific information concerning childhood experiences and assessing the effects of memory age, gender, etc. Results confirm that in old age people can sometimes retain vivid and detailed memories of childhood environment to a surprising degree. This is particularly notable in relation to schooling, since the choice of School as a memory topic among the very elderly, both in free and cued recall, is very low, suggesting a low level of personal interest.

There is some slowing in the annual percentage rate of forgetting over the passing years. This is particularly the case after the age of 40 (see fig 6.3.1.1). Such a decrease in the rate of forgetting is consistent with the findings of Bahrick (1984) in relation to retention of Spanish over fifty years. Bahrick found a steep initial forgetting rate over the first five years after ceasing to study the language, followed by a flat function. Rather earlier, Woodworth and Schlossberg (1954) had written: "The older of two associations of equal strength will decay more slowly."

From the data available here, it is not possible to define the precise nature of the curve of erosion over time. It could, conceivably, be parabolic, i.e. theoretically never showing a total loss of detail by constantly approaching but never actually reaching the X axis. Or, if the slope in Fig. 6.3.1.1 is interpreted as a straight line regression, then it could be predicted that total erosion would occur long after normal life expectancy. In practical terms this need not concern us. What results clearly show is that the older the age of a memory, and in this study also of the rememberer, the slower the rate of erosion with each passing year.

This does not imply that people forget less in their old age. On the contrary, they are more forgetful, particularly of arbitrary information and events. This has been confirmed in many studies, though Cohen and Faulkner (1984) found "No marked difference between all (age) groups in the recall of meaningful facts and personal information". Irene Hulicka (1967) and Cohen and Faulkner (1984) both report cases of 'topic islands' of unimpaired memory in subjects who in most areas are greatly impaired. But even people who are free from any impairment will have areas of interest in which they will remember more. The forgetting curve can evidently be shaped largely by the topic area of recall and the amount of personal interest within it for the individual.

Studies that permit free recall, like the word cue paradigm, used in Study 2 of the present research, enables subjects to choose memories from their richest topic areas. Such choice is denied in studies where recall is demanded of specified items within a given topic area (e.g. Whitten and Leonard, 1981; Williams and Hollan, 1981 and the present study). So the forgetting curve shown in Fig. 6.3.1.1, though probably correct for most early schooling, may not apply to other areas of autobiographical experience. Nor need the categoric rates of erosion shown in Table 6.3.2.1 be generally valid. Different circumstances and activities can put very different degrees of attention, personal involvement, and consequent memorability upon constituent factors.

It should be borne in mind that the remembering demanded of subjects in Study 3 is not of temporally specific events, but of memories generalised over an undefined period of encoding between joining and leaving a particular school. Since this is limited by the questionnaire to not more than 5 years, scores are unlikely to make

much difference to the overall coefficient of annual erosion in a sample of mean age 53.

The rate of retention can be seen as remaining high in normal healthy old age, where erosion rate is at its lowest. But just what causes it to be so is largely unknown. Furthermore, the retention ability does not apply to all types of information. Many studies, including those of Roger Chaffin (1983), and Cohen and Faulkner (1984) have found that the ability to retain rote learning usually commences to decline at around age 60. In the present study a positive response to most questions calls for sensory imaging. The ability to do this may not be impaired by age. In Study 1 of the present research it was found that vividness of imaging does not appear to be affected by normal age decline in the corresponding physical organs of the senses. The predominance of the visual sense in imagery, which was so very apparent in the free recall of Study 1, is evidently not adversly affected by the extent of erosion of visual details shown in Table 6.3.3.1.

The trend in gender differences in the rate of forgetting shown in Table 6.3.3.1 may well be related to the finding in Study 1 that in free recall, women chose the topic of Schooling more often than men. This would produce more frequent mental rehearsal, which, in turn, would assist the retention of details remembered by women more than men, as suggested in Table 6.3.3.1.

Retrieval strategy, improved by years of practice, may help the aged to recall memories. But it certainly cannot play any part in the involuntary recall of childhood events described by Salaman (1982). We are left with an unanswered question: Do the aged in some way, consistent with adaptive advantage, preserve their memory capacity for matters of personal meaning and not for rote? Or is the

capacity for rote learning in some way destroyed by age? The difference reinforces the evidence for independant memory systems discussed in Chapter 1.

CHAPTER 7

GENERAL DISCUSSION

General Discussion

What determines an adult's ability to recall images and events of distant childhood? Galton (1882) gave a succinct all-embracing answer. After much introspection he wrote (p.192): "The subject (i.e. topic, or event) must have a continued living interest in order to retain an abiding place in memory." In succeeding years research has particularised various elements within Galton's portmanteau definition.

But perhaps the point should be made here, that "an abiding place in memory" is not always the same as accessibility. Salaman (1982) cites several memories that seemed forgotten because they had not been accessed until, many years later, involuntary recall showed them to be vividly retained. It is chiefly with accessibility that recent research has been concerned.

For instance, as noted in earlier pages, Brown and Kulick (1977) found surprise, consequentiality and strength of emotion felt at the event to be primary determinants of recall; Pillemer (1984) gives primacy to emotionality; Rubin and Kozin (1984) and Conway and Bekerian (1986) found the best predictor of accessibility is 'personal significance' i.e. perceived importance or relationship to one's self. It will be seen that these qualities are far from mutually exclusive, and indeed, are all constituents of the continued self-involvement implied in Galton's definition.

A close synonym to self-involvement is 'personal meaning', often named as a determinant by researchers. It is, of course, inseparably linked to self-involvement for it is the self that perceives the meaning, and cannot feel involved in something

meaningless. William James (1890) and Bartlett (1932) both draw attention to this point. In Bartlett's phrase: memory is "an effort after meaning."

This effort can be of two kinds. The first involves a conscious, self-imposed search, when trying to remember something. The process consists of trying out a succession of self-generated cues until one triggers the targeted information. The second is an effort to understand and evaluate the personal meaning of something brought to mind by external, internal or even subconscious cues. Cueing effectiveness is central to both.

Study 2 concerned itself with only two categories of cueing. Real life provides an almost infinite variety to match the unlimited diversity of remembered experiences. This has precluded any narrow research into what is undoubtedly a major determinant of memory retrieval. Apart from the sheer unmanageable breadth of the field, for the most part, we pay attention to what is recalled but not to the cue that recalled it. However, certain common denominators of successful cueing have been observed and recorded in the literature. For example, in a series of experiments on the recall of diary entries Wagenaar (1986) found that it is the specificity of cues that determines their effectiveness, and that understandably, specificity is greatly enhanced by additional cues. Conway (1990) proposes that if a cue is sufficiently specific retrieval will take place directly without any search process in the memory store. Specificity is also implied in Bartlett's (1932) contention that what we really remember is not just something but its relationship to something else. This 'something else' is crucial to the cueing of the memory by its objective and affective relevance.

Thus it would seem that the answer to what is an effective cue, is perceived relevance to the personal meaning of the targeted information. The relevance may or may not be immediately apparent. As with Wagenaar's multi-cueing experiment, it can be progressively enhanced by the elaboration of cueing until a threshold of recognition is reached sufficient to trigger the recall.

Factors such as vividness, surprise and unusualness should probably be regarded as descriptive attributes of what is remembered, rather than as primary determinants of retrieval. In previous research these attributes have been noted in adult memories. The present research has confirmed that childhood memories are rated as high in vividness, clarity and realism. Moreover, Study 2 showed that factors such as vividness, importance, unusualness and frequency of recall are highly correlated with the emotionality of the memory.

Factors as emotionality, self-involvement and personal importance are attributes of a different kind. As Nelson (1991), Fivush (1951) and Bartlett (1932) affirm, autobiographical recall is impossible without them. By whatever name, they are synonymous with experiential awareness of oneself.

As was argued in the introduction to this thesis, in order to serve its adaptive purpose, one would expect the memory of 'what I felt about it' to be long retained. Evidence of its retention even after 'what happened' is forgotten is classically provided by Claparede (1911) who concealed a drawing-pin in the palm of his hand and shook hands with an amnesiac patient. This patient never remembered what had happened, but remembered never to shake hands with Claparede again. A more recent example is provided by a subject in the present Study 1. This subject vividly remembers his excitement as he rushed downstairs from his

bedroom to unwrap the present for his seventh birthday, which he knew he would find on the table. Yet he cannot recall what the present was.

What sort of things 'retain an abiding place in memory?' In Study 1 of the present research it was not unexpected to find that the 633 memories examined were as diverse as the 109 subjects who provided them. But it was not anticipated that so many of these memories would fall into so few topic categories. Nearly half (49%) of the events remembered in free recall fell into the top four categories; in rank order: (1) School, (2) Trivia, (3) Illness, Injury and Hospital and (4) Family and Family Occasions. Trivia describes any happening that was evidently meaningful for the child but would probably not seem significant from an adult perspective, e.g. spilling a bottle of fruit juice in the pram. The recall of Trivia is markedly higher in younger encoding ages and plunges at an apparent watershed at around age 7. It is probable that to the 49% listed above should be added a good deal from the category: Births, Anniversaries, etc. since these are mostly within the family. The high overall incidence of school memories, which commence at age 3 - 5 is, no doubt, an inevitable consequence of confining encoding ages to 18 and below. Regarding schooling, it is interesting that despite anecdotally frequent reports of strong impression made by first days at nursery, pre-prep and prep school, and later at colleges and universities, more than half (52%) of all school memories were encoded between ages 9 - 14.

The onset of puberty, 12 -14, also shows a watershed by a sudden plunge in the recall of family events and a corresponding rise in the egocentric category of Achievements. This is compatible with attitudinal changes sometimes reported by developmental psychologists. (Inhelder and Piaget 1958, Flavel 1963, Beard 1969, Meadows 1983).

Gender differences are apparent in the topic incidence of recall. Women tend more often to remember schooling and family matters. Men recall more childhood adventures and trivia. This is in line with the discussion of gender differences in parental attitude and upbringing discussed by Fivush and Reese (1991). They conclude that from the beginning of life, females are encouraged to engage more in social interests and social interaction. Early gender differences in up bringing are also confirmed by the findings of Rubin, Provenzano and Luria (1974).

Altogether, the 633 memories in Study 1 were categorised, by consensus among three independent judges, into 20 topic areas. Study 2, Cued Recall, produced 676 memories, but the same three judges found no new categories were needed to accommodate the larger number. Nor was the rank order of topic areas substantially different from that of the Free Recall in Study 1. Inexplicably, Illness, Injury, Hospitals slips down ten places in Study 2 (from 3rd to 13th) while Catastrophes, Fire, Accidents rises ten places from 17th in Study 1 to 7th in Cued Recall. Otherwise, with the exception of Pet, which was an object cue word in Study 2, all other categories stay within three places of rank order in both studies. Evidently, although speed of retrieval from the long-term memory store is dependent upon the type of cueing, the nature of the topics recalled is not. Of course, both studies imposed age of encoding constraints. But the three year age periods of Study 1 were much narrower.

In both studies recall was required of discrete events. The ability of subjects readily to recall discrete events does not, at first sight, seem to accord with the findings of Barsalou (1988) who found that most autobiographical memories are of extended events rather than isolated experiences. Yet is there really a difference?

As Bartlett (1932) points out an autobiographical memory is not simply remembering something, but remembering its relationship to something else - to its meaningful part within a thematic hierarchy which must surely comprise an extended context of the single episode.

As would be expected, topic areas recalled are largely dependent upon the age of encoding reflecting changes in abilities, interests and activities. Studies 1 and 2 are both confined to childhood events, so findings should not be generalised beyond the teens. Results cannot be compared to those of research based on the distribution of memories across an adult life-span. For instance, in such a study carried out by Cohen and Faulkner (1987) it was found that the category: Births, Deaths and Marriages easily topped the list of rank order at 22%. In the present studies, this category is not even separately listed.

Subject age is also an important determinant of what is remembered. Here, the findings strongly reflect Galton's (1982) pre-requisite of "continued living interest." For example, in extreme old age, the incidence of School memories plunges steeply to near-extinction. This is evidently a matter of choice rather than of ability, for in Study 3 subjects aged 80+ demonstrate that they can remember details of their schooling surprisingly well if asked to do so. On the other hand, family often plays an increasingly important role in the lives of the very old, both in providing support and reminiscence. Accordingly, the category Family increases in the rank order of memories in old age. This shift in topic incidence probably reflects a shift in the function of reminiscence. For an elderly person, concerned to maintain the self-concept, family is a more important aspect of personal identity than schooldays.

A prominent attribute of childhood memories is imagery (Brewer 1986). In Study 1 it was found that imaging is predominantly visual, though other senses are also frequently involved. Next to vision, sound is most often imaged. For the most part, the sound concerns the voices of other people Among the other senses, smell, though relatively seldom imaged, is very powerful in evoking recall when it is contextually meaningful and individually specific. Thus it appears that sensory qualities are closely tied to childhood memories and can be seen as determinants of retention.

Let us now turn to the question; what functions do autobiographical memories fulfil? At a personal level, our autobiographical memories help to develop a self-concept; an abiding recognition that, no matter how diverse the events of life may be, they all relate to one experiencing ego - one's coherent Self. As Rubin (1986 p.7), has written: "Autobiographical memory is about the self, the source of information from which we make judgements of behaviour." Autobiographical memories are the basis for what Fitzgerald (1988) calls the self-narrative. These considerations suggest reasons why the subjects in Study 3 retained detailed memories of the school they attended from 6 - 11 years of age. This period and these experiences, when a child begins to move out from the family into a wider society, must be crucial for formation of the self-concept.

Inter-personally, by remembering how we ourselves felt in similar situations, we can infer the feelings of others, anticipate their reactions and formulate appropriate responses. In a competitive society, this is clearly an adaptively useful ability, made possible by the presence of an affect component within personal memories, as hypothesised earlier.

At a social level, the sharing of autobiographical memories does more than provide material for conversations. It helps to develop intimacy and friendships (Cohen 1995). It also fosters a feeling of protective security in belonging within a social group. The adaptive value of these attributes can be inferred from the fact that the same social functions are common to every species of gregarious animals. The only difference for mankind is that for us communication is not limited to sight, sound, smell and body language. We have evolved the articulated language required to cope with our sophisticated needs, as well as a more flexible internal 'time clock' that enables us to escape from the present tense and use recall of the past to plan strategy for the future. Thus, both at the personal level of a single life span and at the phylogenetic level of survival, autobiographical memory provides adaptive advantages made possible by an affect factor that aids behavioural discrimination.

The present writer is far from being the first to focus on the essential presence of an affect factor in autobiographical memory. Bartlett (1932) wrote: "Perception of an event is of two kinds; sensory and attitudinal. Both must be present to provide a meaningful memory." Fivush (1951 p.83) expresses much the same thought: "A personal memory is a representation of the whole state of mind on the past occasion. Unless the feeling is reconstructed, fully appropriate cueing cannot occur." Piaget (in Inhelder and Piaget 1958 p.347) finds: "Affect and cognition are indissociable in real life" and in 1969 he added "An individual first experiences a situation affectively before he can comprehend it or use his understanding." Piaget thus echoes the findings of Bartlett (1932) in according primacy to affect in the retrieval of personal memories. The duality of content and an inseparable link between self and affective consciousness has been more recently affirmed by

Nelson (1991): "All experience that involves awareness of the self will have two aspects of remembering, recall of 'what happened' and 'what I felt about it.'"

Perception of this duality, then, is not new. But what is, perhaps, new in Study 1 of the present research is empirical evidence for the existence of this duality and the powerful contribution that this affect component can make to the holistic impact of a memory. Thus, the behavioural guidance provided by affect to encourage what is beneficial and avoid what is harmful is clearly an adaptive function of this affect component.

The best-known proponent of the duality of remembering is, of course, Freud, whose psychiatric treatment was based upon it. The theory holds that neurotic states are frequently the result of suppressing the 'what happened' aspect of a traumatic experience, while vividly retaining the feelings about it. These then cause distress by their inexplicable persistence. Once the memory of 'what happened' is restored the cause of the subjective suffering can be rationally understood and is therefore likely to diminish.

In the present research subjects, when asked, invariably reported feeling particular emotional qualities related to their memories. The level of emotionality is apparently unaffected by the age of encoding across the age spans 5 - 18. There was, however, a decrease in the recall of separately named emotional qualities below the encoding age of 5. This is especially so for encoding before the age of 3 (Table 4.3.7.1). Gender differences, overall, are only marginal, though results do suggest that women may retain awareness of jealousy longer than men, while on the other hand, women harbour feelings of frustration, fear and grief over the years, less than men. Subject age (Table 4.3.7.4) shows no decline in the intensity

of the most frequently felt emotions over the years. Yet in old age, the difference between subjects' ratings of 'then' and 'now' is seen to narrow. The number of subjects aged 80 and over is too small in the present sample to provide statistical significance. But it is interesting that such a narrowing between feelings 'then and 'now' agrees with the personal experience of Salaman (1982) and of the several famous authors she quotes, observing that when the obscuring activities of 'now' are replaced by the tranquillity of old age, then vivid recall of 'then' returns, together with its emotional impact.

In view of the usually evident importance of visual and other imaging to remembering, it was quite unexpected to find in Study 1 that 15% of the total sample claimed sometimes not to image at all, or not visually. Yet they asserted, even when challenged, that they recalled with high vividness or realism. This implied that for them there was some powerful factor other than the normally present element of imaging to give the memory its potency. The fact that, in every case the subject imaged normally in most of their recalls showed that this was not an esoteric subject 'quirk' and deserved investigation across the whole sample.

To investigate the nature of the additional factor it was considered the clearest answer might be found where the difference is greatest, namely in those memories which were highly rated for vividness but where the subjects rated their sensory imaging as zero. The eight subjects concerned were asked: "In a nutshell, what does this memory mean to you?" Their answers were quoted verbatim in Chapter 4.4.

It will be seen that the 'no imaging' examples are well spread across encoding age periods and that each express what Nelson (1991) has defined as "What I felt

about it." These examples are, of course, exceptional in that they ascribe the entire impact of the memory to affect alone, coupled to historic knowledge of the event. But Nelson, and the present writer, hold that all personal memories have two aspects of remembering. Besides affect there is recall of 'what happened' in concrete terms, which as Brewer (1986) points out is based on mental reconstruction by sensory imaging. Conjectural reasons why 'what happened' is remembered but not imaged in the above cases is offered in Section 4.4. Most are memories of autobiographical facts or of generic events. In the majority of the memories analysed in this study Brewer's contention is, in fact, substantially confirmed by findings in the present study. 85% of subjects imaged in each of their 6 memories. The 15% who did not all imaged in 5 out of their 6. The 'no imaging' exceptions were only 1.3% of the 633 memories examined. Nevertheless, the existence of memories without imagery provides empirical evidence that 'imaging is not all'. Memories without imagery can still be rated as highly vivid and realistic.

Being able to remember what to welcome and what to avoid is clearly useful during a person's life-time. But what, one might ask can be the philogenetic survival value of retaining a facility for autobiographical remembering into old age, well beyond the physical ability to reproduce the genetic trait. The short answer is, none - but it was not always so. When nature evolved homo sapiens, adult life expectancy was such that no-one was expected to reach old age as measured by the present standard. As a result, today the genetic ability to remember persists even after the philogenetic usefulness is past. Nature has even provided a kind of safety margin to ensure that the benefits of learning from experience can last a life-time. The rate of forgetting slows with the passing years as can be seen in Study 3 of the present research.

What enables the very old to recall childhood memories often better than during their middle years still remains a matter of conjecture. But if one heeds the growing consensus of opinion that autobiographical memory is about the self (e.g. Rubin 1986) then a plausible answer may centre round closer identification with the real self. In other words, while age distances the subject from the event, it brings him closer to the unaltered, original self that experienced the childhood event. This makes it possible for the self to recapture the affective component of the experience, without which, as Fivush (1988) says proper cueing cannot occur. In terms of Johnson's MEM model discussed in Chapter 1, the role of the Reflective component is greater in old age.

This 'cleansing' of the self is needed because, as Shakespeare observes, in life we role-play many parts; first, the parentally dependent child, then the emerging teenager, asserting independence; in due course, the betrothed, the married partner, parent, bread-winner, exponent of occupational and possibly hobby skills, respected member of a particular social group, etc., etc. Each role demands its own perspective of attitude and behaviour to be properly played and meet its obligations. Usually it is only in old age that these role playing responsibilities can be put aside and a return can be made to unimpeded awareness of the underlying real self. This would explain the views quoted by Salaman (1982) about the dormancy of childhood memories until old age. The present studies provided ample confirmation that elderly people do indeed retain vivid memories of childhood experiences. This was evident both when they were allowed to choose freely what memories to report (Studies 1 and 2) and also when they were constrained to recall specific information (Study 3).

Salaman (1982) draws attention to the importance that the elderly may feel to pursue what Butler (1963) has called the life review, in order better to understand their selves in the light of life's long experience. Such motivation would encourage the frequent rehearsal of well-remembered events that is characteristic of the elderly, as noted by Cohen, Conway and Maylor (1994).

It is only to be expected, that for the most part, the findings in the present three studies provide confirmation for what other researchers have already found. Yet in some respects, the present studies also extend previous research. They use more naturalistic methods than are usually possible in a clinical or experimental laboratory setting. They also illustrate the advantage of using both survey and experimental methodology to seek converging evidence. They study recall for specified life periods by a large sample of men and women of different ages and explore gender differences and subject age effects They provide analyses of the nature of the memories in more detail than most other studies. In Study 2, they look at determinants of the speed of retrieval, while Study 1, at determinants of incidence and quality. In Study 3 a way was devised to measure the rate of forgetting across the life span. It is hoped they may contribute something to serve the need expressed by Brewer (1986 p.35) in relation to the study of autobiographical memory for "much more empirical work on the basic descriptive aspects of this important form of human memory."

In several areas, the present research extends previous findings. For example, few researchers, as reported on previous pages, have produced evidence of the earliest memory people can recall before the age of 36 months. The evidence in Study 1 that 90 out of sample of 109 subjects (i.e. 83%) could produce memories from below the age of 3 without difficulty must throw a new light on how early

autobiographical memory normally starts. Two reasons come readily to mind as to why, in Study 1, memories younger than 3 were found to be more accessible than has been usually supposed. One concerns the experience of Salaman (1982) that if only one can relax and allow oneself to focus on a particular life-period, memories come pouring in. In Study 1, everything possible was done to facilitate this condition, to a greater degree than is usually possible in a laboratory setting. The second reason is, that given the necessary relaxed atmosphere, the life-period on which to focus was specifically indicated, (i.e. Salaman's second pre-requisite). Thus the present research pushes back the boundaries of childhood amnesia.

Perhaps the most important finding, however, concerns the role of emotion in autobiographical memory. As originally hypothesised, the studies reported here provide strong evidence that childhood memories retain their emotionality and personal meaning across the life span and into old age (Study 1). And, furthermore, that the emotionality of memories is linked to their vividness and importance (Study 2).

The other primary assumption was that autobiographical memory, like its symbiotic twin, articulated language, has fundamentally adaptive value This is supported by the Darwinian truism that were it not for behavioural discrimination guided by learning from experience, we could not now exist in our present form. Adaptive value applies inseparably both in the short-term sense of the living generation and in the long-term sense of the survival of the species. Short-term, it depends upon the survival of enough members of the species, during their reproductive age-spans, to pass on their favourable genes to the next generation. As Aldous Huxley once cynically remarked: "We are only caskets for our chromosomes." The ability of an individual to fulfil this role will clearly depend

upon the ability to survive within the relevant physical and social environment. Although from the birth, this must involve instinct and procedural memory, continued success must depend upon learning from experience, that is, by personal memory of the past and of what is pleasant and harmless, and what to avoid because of unpleasant or dangerous consequences. Study 3 provided evidence that detailed memories are retained from the childhood years with high levels of confidence. Hence the adaptive value to the individual of the basic function of autobiographical memory, and in particular, of its discriminating affect component.

In the long-term, phylogenetic perspective, the cyclical transmission of favourable genes will occasionally be interrupted by mutations that modify genetic structure, and therefore, the attributes of individuals. But Darwin's principle of natural selection still applies. If those individuals who carry the genetic revision enjoy adaptive advantage, then it is they and their progeny who will take over and become the new norm. The process is usually slow. Richard Leakey (1992) and most anthropologists today, believe it has taken several millions of years to move us from our earliest recognisable forebears, the Australopithecines, through such successive mutations to our present human status. Conversely, if a mutation results in adaptive disadvantage, then it will not persist. Leakey proposes that this probably accounts for why many hominid species disappeared without trace.

Turning now to the adaptive value of autobiographical memory within the life-time of the individual, the importance of the adaptive function of remembering the past is widely recognised by researchers today. For instance, Nelson (1991) advocates that autobiographical memory should be regarded in an adaptive perspective. Tulving (1991) evidently endorses this view. He writes (p.25) that autobiographical memory consists of a "number of different brain/ behaviour/

cognitive systems and processes, that through co-operation and interaction, make it possible for their possessor to benefit from past experience and thereby promote survival."

The essential role of the affective component has still to be fully explored. The present studies have merely demonstrated its existence. It is hoped that future research will take this further. It would be good to find a way to quantify its contribution to the overall strength of a memory in various circumstances. For only by looking at the part it plays can cognitive psychology observe the whole memory.

APPENDICES

Appendix A

EARLY MEMORY QUESTIONNAIRE

Introduction

Thank you for your co-operation. The aim of this research is to examine and compare what kind of things people of different ages tend to recall as early childhood memories.

Your name and address will not appear on this questionnaire, so your answers will be quite anonymous. The only particulars I'm filling in are: male/female and, for demographic classification, I'd be grateful if you'll tell me your age.

Male/Female		Age:	Age Group:	20/39	40/59	60 Plus
a	b	c		d	e	f

---

1 Thinking back to your own early childhood, what is the earliest memory you can recall? If you're not quite sure which is the earliest, make a sensible guess. Tell me briefly what happened.

(record brief description on separate sheet)

1.1 How old would you have been then?

1.1	2.1	3.1	4.1	5.1	6.1

1.2 Would you say your memory of this event is:

clouded and vague? (a)

or fairly clear and definite? (b)

or vivid and detailed? (c)

1.2	2.2	3.2	4.2	5.2	6.2
a b c	a b c	a b c	a b c	a b c	a b c

1.3 Is the visual sense involved - do you picture it in your mind's eye?

1.3 Yes/No	2.3 Yes/No	3.3 Yes/No	4.3 Yes/No	5.3 Yes/No	6.3 Yes/No

(If yes)	Is it in black and white	(a)
	or colour?	(b)
	Is it still like a snap	(c)
	or moving like a film?	(d)
	Do you see yourself in the picture as though looking at the scene from outside?	(e)
	or do you, as it were, see it through your own eyes, as you did when it happened, without seeing yourself?	(f)

1.3	2.3	3.3	4.3	5.3	6.3
a	a	a	a	a	a
b	b	b	b	b	b
c	c	c	c	c	c
d	d	d	d	d	d
e	e	e	e	e	e
f	f	f	f	f	f

1.4 And how about sound - do you hear any voices in this memory?

1.4 Yes/No	2.4 Yes/No	3.4 Yes/No	4.4 Yes/No	5.4 Yes/No	6.4 Yes/No

(If yes)	Your own voice	(a)
	or others?	(b)

1.4	2.4	3.4	4.4	5.4	6.4
a	a	a	a	a	a
b	b	b	b	b	b

1.5 Are there any other sounds?

1.5	2.5	3.5	4.5	5.5	6.5
Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

(If Yes) What are they?

1.6 Does this memory bring back any particular smell (a)
or taste (b)
or sense of touch (c)
or cold (d)
or heat (e)
or pain (f)
or none of these? (g)

1.6	2.6	3.6	4.6	5.6	6.6
a	a	a	a	a	a
b	b	b	b	b	b
c	c	c	c	c	c
d	d	d	d	d	d
e	e	e	e	e	e
f	f	f	f	f	f
g	g	g	g	g	g

1.7 How vivid would you say the various senses are in this memory? Suppose you rated each of them on a scale where 1 meant not at all and 5 meant as vivid as anything in real life, what mark between 1 and 5 would you give to.

visual imagery	(a)
sound	(b)
smell	(c)
taste	(d)
touch	(e)
heat	(f)
cold	(g)
pain	(h)

1.7	2.7	3.7	4.7	5.7	6.7
a	a	a	a	a	a
b	b	b	b	b	b
c	c	c	c	c	c
d	d	d	d	d	d
e	e	e	e	e	e
f	f	f	f	f	f
g	g	g	g	g	g
h	h	h	h	h	h

1.8 Now I'll read you three different ways people sometimes say they remember events I'd like you to tell me which, if any, describe best the way you recall this particular event.

(a) "It's like a play-back. I can see and re-experience it again".

(b) "I don't really remember it happening. But I remember <u>that</u> it happened. I know certain facts about this event".

(c) "With an effort I can re-construct the event, building up the picture by drawing on what I know about it".

(d) Or would you say you recall this particular event by some mixture of the three - if so, which ones?

(e) None.

1.8	2.8	3.8	4.8	5.8	6.8
a	a	a	a	a	a
b	b	b	b	b	b
c	c	c	c	c	c
d	d	d	d	d	d
e	e	e	e	e	e

1.9 Can you remember what was happening just before the event?

1.9	2.9	3.9	4.9	5.9	6.9
Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

1.10 Can you remember what happened immediately after?

1.10	2.10	3.10	4.10	5.10	6.10
Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

(If Yes to 1.9 or 1.10)

1.11 How confident are you that you really remember the before and after scenes, as distinct from relying on what you know must have been the case?

Quite certain	(a)
or Fairly sure	(b)
or Not sure	(c)

1.11	2.11	3.11	4.11	5.11	6.11
a	a	a	a	a	a
b	b	b	b	b	b
c	c	c	c	c	c

1.12 Now let's turn to the feelings or emotions that the event aroused in you at the time. I shall read you a list of possible feelings and I'd like you to tell me which ones were aroused by the event when it actually happened, and how strongly you felt these emotions at that time. Please rate each of them on a one to five scale, where 1 means hardly at all and 5 means maximum strength.

Incidence and rating (zero rating i.e. I not entered)

Happiness	(a)
Unhappiness	(b)
Fear	(c)
Disappointment	(d)
Anger	(e)
Excitement	(f)
Frustration	(g)
Grief	(h)
Jealousy	(i)
Physical pain	(j)
Surprise	(k)
Anxiety	(l)
Other	(m)

1.12	2.12	3.12	4.12	5.12	6.12
a	a	a	a	a	a
b	b	b	b	b	b
c	c	c	c	c	c
d	d	d	d	d	d
e	e	e	e	e	e
f	f	f	f	f	f
g	g	g	g	g	g
h	h	h	h	h	h
i	i	i	i	i	i
j	j	j	j	j	j
k	k	k	k	k	k
l	l	l	l	l	l
m	m	m	m	m	m

1.13 Those last ratings were about what you felt at the event. Now I'd like you to rate what you feel about the memory of the event. In other words, which feelings are aroused today when you recall the memory, and how strongly do you feel them? We'll use the same list and the same scale: 1 means not at all and 5 means as strongly as possible. So to what extent does the memory today arouse:

Happiness	(a)
Unhappiness	(b)
Fear	(c)
Disappointment	(d)
Anger	(e)
Excitement	(f)
Frustration	(g)
Grief	(h)
Jealousy	(i)
Physical pain	(j)
Surprise	(k)
Anxiety	(l)
Other	(m)

Incidence and rating (zero rating i.e 1 not entered)

1.13	2.13	3.13	4.13	5.13	6.13
a	a	a	a	a	a
b	b	b	b	b	b
c	c	c	c	c	c
d	d	d	d	d	d
e	e	e	e	e	e
f	f	f	f	f	f
g	g	g	g	g	g
h	h	h	h	h	h
	i	i	i	i	i
	j	j	j	j	j
	k	k	k	k	k
	l	l	l	l	l
m	m	m	m	m	m

1.14 How often would you say you recall this memory:

Once or twice a month	(a)
or Once or twice a year	(b)
or Once every few years	(c)
or Less than once every ten years	(d)

1.14	2.14	3.14	4.14	5.14	6.14
a	a	a	a	a	a
b	b	b	b	b	b
c	c	c	c	c	c
d	d	d	d	d	d

1.15 How often have you talked about this event to others?

Once or twice a month (a)
or Once or twice a year (b)
or Once every few years (c)
or Less than once every ten years (d)

1.15	2.15	3.15	4.15	5.15	6.15
a	a	a	a	a	a
b	b	b	b	b	b
c	c	c	c	c	c
d	d	d	d	d	d

1.16 Would you say your memory of this event is entirely first hand (a)
or based on photos, diaries, family talk, etc. (b)
or a mixture of these (c)

1.16	2.16	3.16	4.16	5.16	6.16
a	a	a	a	a	a
b	b	b	b	b	b
c	c	c	c	c	c

1.17 What sort of things bring this memory to your mind?

Would it be something you see or hear? (a)
(If Yes) Always the same one? (b)
Do other senses like smell, taste, touch, heat, cold,
pain, ever remind you of this event? (c)
Does any particular action remind you of it - something
you do or someone else does? (d)
Does it come to mind with a particular kind of feeling
which you recognise as belonging to this event? (e)
Or is it produced by a train of thought? (f)

1.17	2.17	3.17	4.17	5.17	6.17
a	a	a	a	a	a
b	b	b	b	b	b
c	c	c	c	c	c
d	d	d	d	d	d
e	e	e	e	e	e
f	f	f	f	f	f

1.18 Suppose you had to store this memory in a file, labelled according to what it means to you, how could you label it?

Now let's turn to a different event.

Please recall one of your clearest memories from the next 3-year period of your life - that is, between the ages of - and =- .

1: 0 - 3

2: 3 - 6

3: 6 - 9

4: 9 - 12

5: 12 - 15

6: 15 - 18

(Record brief description on separate sheet)

CUE WORDS

Of the 32 words used, 16 name objects and 16 specify emotions, 8 of which are happy and 8 unhappy. Both objects and emotions are chosen to be equally applicable to experience in either of the age groups 0-8 and 10-18.

The word list is divided into four sets ABCD as follows. One set of emotions and one of objects is used for each of the age groups.

Emotions	**Objects**	**Emotions**	**Objects**
Group A	Group B	Group C	Group D
joyful	table	anxious	train
resentful	pram	caring	cupboard
belonging	bed	bewildered	hat
frustrated	toy	confident	car
excited	shoes	greedy	pen
sad	pet	friendly	coat
lucky	chair	selfish	sofa
frightened	bath	achieving	stairs

Presentation is randomised by alternating group order as follows, and by drawing cards at random from within the 8 in each group.

1	AB	CD
2	BA	DC
3	AD	CB
4	BC	DA
5	CD	AB
6	DC	BA
7	CB	AD
8	DA	BC

INSTRUCTIONS FOR CUED RECALL

NOTE: These instructions are intended, for the sake of speed and legibility, to allow the experimenter to write in the spoken answers

---

What we shall be looking into is how word associations can trigger memories. We shall measure how fast and how well different kinds of words can do this.

Beside you is a little tray with 8 small cards, lying face down. Each card has a word printed on its face side. I shall ask you to pick up any card at random, turn it over, and without any hesitation, immediately read the word aloud. As you do so, I shall start this stopwatch. Just as soon as the word you've read suggests a memory to you, immediately say YES. I shall stop the watch and note how long it took.

Then I shall jot down on this form just a few very brief details about the particular memory. Roughly how old were you when it happened? Who else was there? In a nutshell, what happened? Where was it? When was it?

Also, on a five-point scale I shall ask you to rate: how vividly do you recall this memory? How personally important to you do you feel the remembered event to be? Do you recall it seldom or often? How unusual was this event for you when it happened? And how emotional was it?

Here's what the form looks like. (Hand subject a blank form)

Let's run through an example. Suppose I picked up and read the word TERRIFIED. For me, perhaps it triggers the memory of how I upset my pram when I was left alone in it in the front garden and became terrified by the noise of a drum and fife band approaching. The instant the memory comes, I say "YES". The watch is stopped. The form gets filled in.:-

CUE WORD.....Terrified

WHO WAS THERE?.....Self and drum and fife band

WHAT HAPPENED?.....Upset my pram in frenzied terror

.....

Where?.....In front garden

WHEN?.....?

ABOUT HOW OLD WERE YOU?.....2

Appendix D

S. No. .....

CUED MEMORIES OF EVENTS

Encoding age group: 0-8 Years (or 10-18)

CUE WORD .....

RESPONSE TIME (Seconds) .....

WHAT WAS THE EVENT? (very briefly) .....

.....

.....

WHO WAS THERE? .....

WHERE WAS THIS? .....

WHEN WAS THIS? .....

ABOUT HOW OLD WERE YOU? .....

Please ring round the appropriate number on each scale

HOW VIVID IS THIS MEMORY?	1 (not at all)	2	3	4	5 (extremely)
HOW IMPORTANT WAS THIS EVENT TO YOU AT THE TIME?	1 (not at all)	2	3	4	5 (extremely)
HOW OFTEN DO YOU RECALL THIS EVENT?	1 (almost never)	2	3	4	5 (very often)
HOW UNUSUAL WAS THIS EVENT FOR YOU AT THE TIME?	1 (often happened)	2	3	4	5 (first time)
HOW EMOTIONALLY AROUSING WAS THIS EVENT?	1 (not at all)	2	3	4	5 (extremely)

NOTE: The questionnaire was filled in on subjects' behalf from spoken answers

Please ring round the appropriate number on each scale

HOW VIVID IS THIS MEMORY?	1 (not vivid)	2	3	4	5 (very vivid)
HOW IMPORTANT WAS THIS EVENT TO YOU AT THE TIME?	1 (not at all)	2	3	4	5 (extremely)

(Note: My 'terrifying' event may seem trivial to others, but I still feel panic in the pit of my stomach if I hear a drum and fife band, so TO ME it seems very important - I shall ring 5.)

HOW OFTEN DO YOU RECALL THIS EVENT?	1 (almost never)	2	3	4	5 (very often)
HOW UNUSUAL WAS THIS EVENT FOR YOU AT THE TIME?	1 (often happened)	2	3	4	5 (first time)
HOW EMOTIONALLY AROUSING WAS THIS EVENT?	1 (not at all)	2	3	4	5 (extremely)

Each memory should take a minute at the most to complete. There's no need to strain for precision on the rating scales - your general impression is a good enough guide.

And please - <u>this is very important</u> - don't think you're expected to remember all the who, what, where, when questions. (Perhaps you noticed in my example I left WHEN? blank because I didn't know.) Tell me only what you actually remember - not what you now think, or know must have been the case. Anything you don't actually remember, please be sure we leave blank, because for our purposes what you can't recall is just as important as what you can.

We shall look at memories from two broad age groups. The first, from birth to 8 years old. The second group will be from 10 to 18 years old. We shall leave 9 years old blank as a division between the two groups.

We shall try 16 words in each of the two age groups. If a word fails to trigger a memory in the right age group within 30 seconds (I'll tell you when) I shall just write NIL on the form and we'll go on to the next word

Any questions?

Right - then we'll start with memories between birth and 8 years old. (Or 10-18) Ready? Please pick up and read a card - now.

STUDY 3

Finally, I'd like you to think back again to when you were about 6-11 years old. I shall ask you some questions about your schooling at that time. But I shan't expect you to remember all the answers.

So please try not to guess. Don't tell me what you think was probably the case - only what you actually remember. If you don't remember, just say so. But if you do remember, I'd like to know how definite the memory is. So for each answer I shall ask you whether you're (a) absolutely sure, or (b) fairly sure, or (c) not very sure.

1 What was the name of the school you went to when you were aged between 6 and 11?

Answer .....

a b c

(How old were you when you left this school? Age .....

Was your next school in an entirely different building? Yes/No
(If older than 11 or if senior school was in same building, close)

2 What was the head teacher's name?

Answer .....

a b c

3 Can you recall the colour of his/her hair?

Answer .....

a b c

4 Can you name any other teacher at this school?

Answer .....

a b c

5 Can you picture him/her in your mind's eye?

Answer Yes/No Vividly (d) fairly clearly (e) vaguely (f)

6 Do you remember what his/her voice sounded like?

Answer Yes/No Vividly (d) fairly clearly (e) vaguely (f)

7 Is there any other teacher you can name at this school?

Answer .....

a b c

8 Can you picture him/her in your mind's eye?

Answer Yes/No Vividly (d) fairly clearly (e) vaguely (f)

9 Do you remember what his/her voice sounded like?

Answer Yes/No Vividly (d) fairly clearly (e) vaguely (f)

10 What was the name of the teacher who took you for singing?

Answer .....

a b c

11 During your last year at this school whereabouts in the classroom did you sit?

Answer .....

a b c

12 Can you remember what was the colour of the floor?

Answer .....

a b c

13 Did you sit at a desk or a table?

Answer .....

a b c

14 Can you recall who sat next to you in this class?

Answer .....

a b c

15 Were the seats benches or chairs?

Answer .....

a b c

16 Do you remember, was there a clock in this classroom?

Answer .....

a b c

(If yes)

17 Where was the clock in relation to where you sat?

Answer .....

a b c

18 Can you recall whether the clock had Roman or ordinary numbers?

Answer .....

a b c

19 During this last year at this school, where did you have lunch?

Answer .....

a b c

20 Where did you hang up your outdoor clothes when you came into the school?

Answer .....

a b c

Scoring System

One mark for each remembered answer.

x 3 for absolutely sure (a) or for vividly (d)

x 2 for fairly sure (b) or for fairly clearly (e)

x 1 for not very sure (c) or for vaguely (f)

Differences in life-styles will probably mean not all questions are applicable to all respondents. Total scores will, therefore, be percentaged on applicable questions only. Any subject for whom fewer than ten questions are applicable would not be included in the sample.

Appendix F

DATA FOR TABLES & FIGURES IN 6.3

PERCENTAGE LOST

MEMORY AGE	THINGS	PEOPLE	VISUAL	AURAL	NAMES	TOPOGRAPHICAL
11	46.7	22.2	40	33.3	20	33.3
12	20	30	40	50	33.3	0
13	60	40	66.7	83.3	16.7	57.1
13	6.7	7	20	16.7	0	0
15	33.3	20	26.7	33.3	20	19
15	10	10	20	50	0	0
16	6.7	20	0	100	0	9.5
17	30	53.3	58.3	83.3	22.2	19
18	73.3	63.3	73.3	100	38.9	76.2
19	26.7	16.7	8.3	33.3	16.7	5.6
19	26.7	36.7	33.3	16.7	20	11.1
21	4.2	16.7	8.3	66.7	0	5.5
22	16.7	23.3	20	66.7	16.7	9.5
28	33.3	76.7	41.7	100	66.7	46.7
28	73.3	70	80	100	50	76.2
29	53.3	80	80	100	66.7	47.6
29	0	0	0	0	0	0
30	60	53.3	46.7	100	33.3	71.4
30	40	50	46.7	66.7	50	33.3
30	63.4	83.3	86.7	100	66 7	61.9
30	0	13.3	13.3	16.7	0	0
31	0	48	40	100	20	0
31	60	90	60	100	100	57.1
32	50	16.7	20	33.3	16.7	57.1
32	43.3	23.3	33.3	50	16.7	33.3
32	20	46.7	26.7	100	33.3	14.3
33	10	16.7	6.7	16.7	16.7	14.3
34	40	36.7	40	83.3	16.7	42.8
34	50	36.7	75	50	11.1	33.3
35	33.3	33.3	33.3	66.7	22.2	33.3
36	33.3	36.7	41.7	100	16.7	38.1
36	30	46.7	53.3	50	33.3	28.6
37	3.3	36.7	20	66.7	33.3	0
37	46.7	13.3	20	16.7	16.7	52.4
37	3.3	0	6.7	0	0	0
37	10	14.8	25	16.7	16.7	0
38	73.3	100	100	100	83.3	76.2
38	16.7	60	60	66.7	50	4.8
38	40	11.1	46.7	33.3	0	42.8
38	8.3	66.7	50	83.3	50	11.1
39	40	43.3	33.3	83.3	33.3	42.8
40	23.3	26.7	40	50	16.7	14.3
40	66.7	83.3	80	100	72.2	66.7
40	73.3	53.3	86.7	100	16.7	72.2
41	46.7	40	66.7	100	25	38.1
42	53.3	40	60	66.7	16.7	57.1

MEMORY AGE	THINGS	PEOPLE	VISUAL	AURAL	NAMES	TOPOGRAPHICAL
43	50	6.7	26.7	33.3	0	52.4
44	3.3	53.3	41.7	83.3	50	5.5
44	56.7	100	86.7	100	83.3	61.9
44	30	60	66.7	100	27.8	28.6
45	40	50	46.7	50	50	38.1
46	30	26.7	26.7	66.7	16.7	28.6
47	80	66.7	60	83.3	61.1	90.5
47	46.7	85.2	80	83.3	83.3	38.1
48	56.7	56.7	60	100	38.9	57.1
48	63.3	43.3	53.3	83.3	38.9	57.1
48	60	53.3	66.7	100	33.3	57.1
49	53.3	80	66.7	83.3	83.3	47.6
50	93.3	100	100	100	88.9	100
51	33.3	20	20	50	16.7	33.3
51	66.7	100	100	100	83.3	66.7
52	0	23.3	0	66.7	16.7	0
53	46.7	63.3	60	100	66.7	28.6
53	26.7	96.7	73.3	100	83.3	9.5
53	63.3	76.7	66.7	100	66.7	61.9
54	50	86.7	93.3	100	66.7	42.8
54	30	53.3	66.7	100	16.7	28.6
55	30	43.3	40	66.7	33.3	28.6
56	50	37	50	16.7	50	57.1
58	40	100	80	100	83.3	42.8
58	0	33.3	8.3	16.7	33.3	0
60	100	100	100	100	100	100
63	40	73.3	80	100	40	38.1
64	0	13.3	0	16.7	16.7	0
65	10	46.7	46.7	66.7	20	0
67	56.7	100	100	100	83.3	52.4
68	73.3	100	100	100	83.3	76.2
68	50	33.3	50		33.3	42.9
69	33.3	90	80	100	83.3	19
70	30	40	20	100	33.3	28.6
71	73.3	81.5	86.7	100	66.7	76.2
81	26.7	4	0	16.7	11.1	16.7
82	12.5	12	25	100	0	0

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